MINING CONGRESS JOURNAL

Now's the time when a *Save to Win* policy is just what the doctor ordered. An ounce of prevention is better than a pound of cure, when you're caring for vital tools and equipment.

For instance, your long-lived, dependable Exide Batteries will last even longer if given reasonable, normal care. Follow these simple rules and *Save to Win.* That's good medicine for you, and bad medicine for the Axis.

MAKING BATTERIES LAST HELPS STOP THE AXIS!

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Exide IRONCLAD BATTERIES

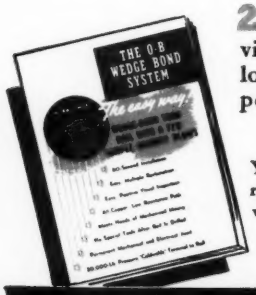
Give your production

A "SHOT IN THE ARM"

Step-up your face voltage with the O-B Wedge Bonding System

More coal, faster! Today, more than ever before, maximum output is a national necessity. Lagging, overloaded face motors have no place in a profitable peak production schedule. Insure a continuously adequate face voltage with the O-B Wedge Bonding System.

1 *The Electric Mobildrill* bores a sharp, clean hole through a 40-lb. rail in less than 40 seconds. Light weight, may easily be carried from joint to joint. Once drilled, rail may be used over and over again without further drilling, the bonding process becoming a matter of a few hammer taps.



2 *The Wedge Bond* provides a continuous, all-copper low resistance path through a permanent mechanical and electrical joint. May be installed in 60 seconds, a few hammer taps "cold-welding" the terminal to rail with 20,000-lb. pressure.

Yes, sir, the O-B Wedge Bonding System is a "natural" for operators who demand a continuously adequate return circuit. Investigate its advantages today. Write the Mansfield office for the new booklet offered on this page—or better yet, see your O-B representative and arrange for a trial installation at your earliest opportunity.

YOURS FOR THE ASKING — Want more information on how to keep your mechanized investment running at top efficiency? The above booklet describes the O-B Wedge Bonding System in detail, tells how it will fit into your bonding program. Just send in your request and we'll be glad to forward your copy immediately.

2298-M

OHIO B BRASS

MANSFIELD OHIO · U · S · A

Canadian Ohio Brass Company, Ltd. Niagara Falls, Ont., Canada

BUY United States Defense Bonds and Stamps

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MINING CONGRESS JOURNAL

Vol. 28 — SEPTEMBER, 1942 — No. 9

Among the many new responsibilities of industry that involve time and manpower, is the job to collect scrap metal. Industrial Salvage Committees have been set up by WPB in more than 400 communities for the purpose of enlisting the cooperation of every industry. Therefore, we urge every mining company to do its part.

Every family in a mining camp should look over its own little "junk" pile in the cellar, barn or garage and contribute its share, no matter how small, to this important effort. New war plants are getting into production and the remaining crucial months of this year must yield metals of all kinds to tip the scales for victory. So "Throw YOUR Scrap into the Fight."

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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THE AMERICAN MINING CONGRESS
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Julian D. Conover, Secretary

The Tanks Are Coming!

Thanks to a continuous supply of vital raw materials, powerful fighting tanks are rolling off the Nation's assembly lines and heading for the fighting fronts in staggering numbers. Marion shovels, working without letup, are doing a real job of producing raw materials so that tank production can continue ahead of schedule.

THE MARION STEAM SHOVEL CO.

Marion, Ohio, U.S.A. *Offices in all principal cities*

Serving industry since 1884

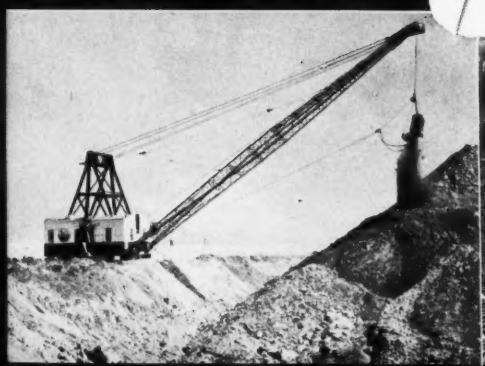
MARION

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • PULL-SHOVELS • WALKERS

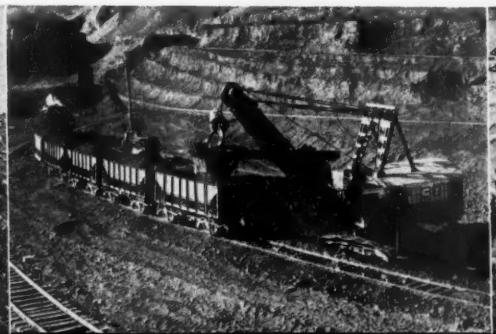
Gasoline — Diesel — Electric — ¾ cubic yard to 35 cubic yards

MANGANESE

NICKEL



COAL

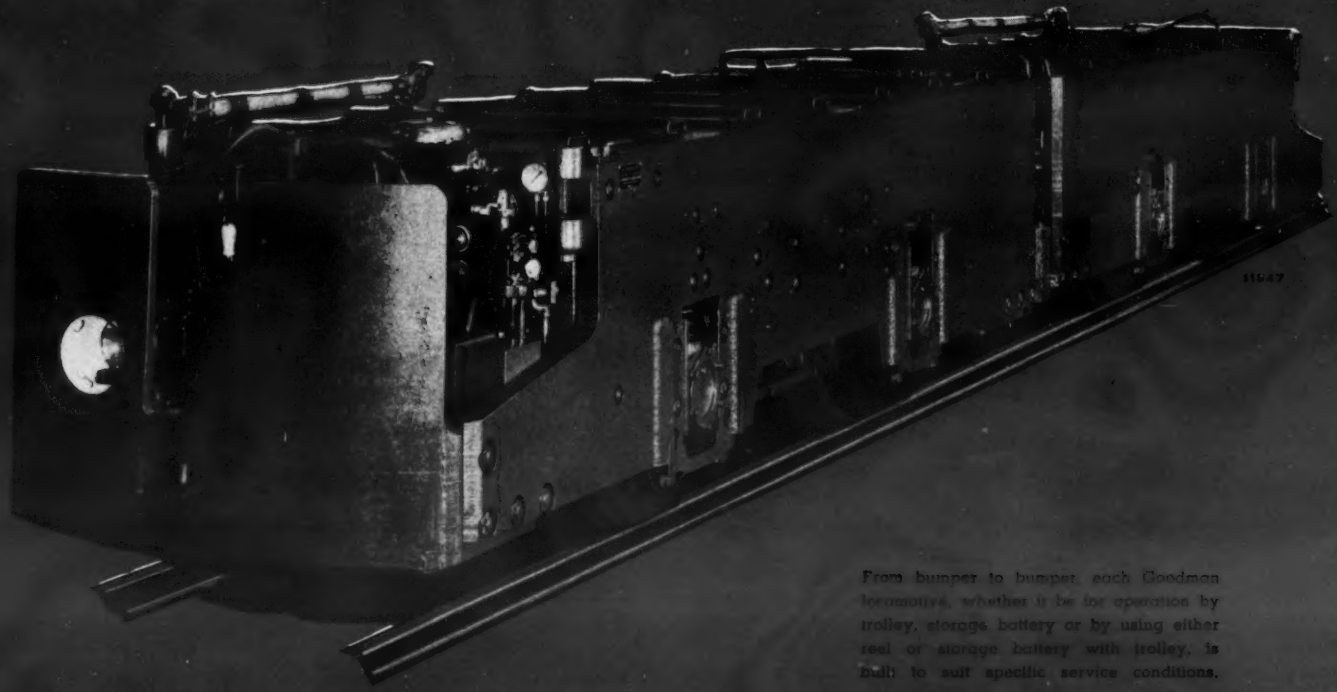


IRON

COPPER

They Fit the Job . .

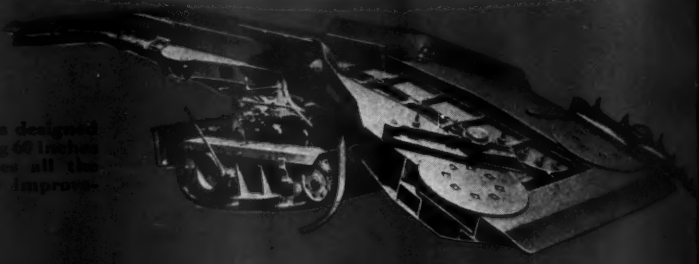
GOODMAN LOCOMOTIVES



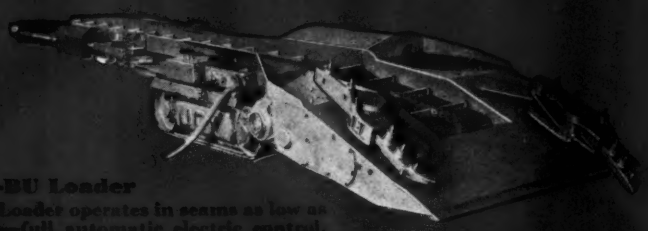
From bumper to bumper, each Goodman locomotive, whether it be for operation by trolley, storage battery or by using either reel or storage battery with trolley, is built to suit specific service conditions.

GOODMAN MANUFACTURING COMPANY HALSTED STREET AT 48TH • CHICAGO, ILLINOIS

JOY EQUIPMENT WILL ENABLE YOU TO MEET TODAY'S PRODUCTION DEMANDS!



★ **Joy 11-BU Loader**
This heavy duty, mobile loader is designed for fast loading in seams averaging 60 inches or more in thickness. Embodies all the latest mechanical and electrical improvements. An economical unit.



★ **Joy 14-BU Loader**
This Joy Loader operates in seams as low as 36 inches—full automatic electric control, individual motors for gathering arms, caterpillars and pump. A rugged, heavy duty machine. Loads up to 5 tons per minute.

Consult a Joy Engineer

PHONE • WRITE • WIRE

Joy 32" Shuttle Car
Ease of control, and extreme flexibility in operation—together with its abundant power, have made this unit a time and money saver wherever it has been used. Its use has cut overhead and increased output in many mines.

Joy 42" Shuttle Car
While the Shuttle Car is relatively new—its continued success and constantly expanding use, proves it does lower section handling costs and definitely increases mine output.

Joy Engineers have had a rather thorough and unique experience in advising and aiding in the mechanization of America's Coal Mines.

This basic and valuable knowledge is, of course, available to you and should be helpful in solving your problems and setting up your future plans.

JOY MANUFACTURING CO., FRANKLIN, PA.

THE WAR CAN'T WAIT..

Donald M. Nelson says to the Mining Industry:

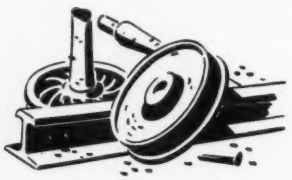
"Every ounce of scrap is needed immediately to get and *keep* war production up to a Victory level. We are counting heavily on the Nation's mines to salvage their tons of broken, useless equipment in this emergency. Old head frames and buildings should be torn down and sold. Every item, however small, should be gathered up. We urge you to organize an all-out scrap drive at once!"

U.S. NEEDS ALL SCRAP..TODAY!

SELL YOUR SCRAP TO SHORTEN THE WAR!

HERE'S WHAT TO LOOK FOR

PLATES AND STRUCTURAL SHAPES . . . Clean out the repair shop—clean up the junk heap. Turn in broken and worn-out parts from chutes, bins, mine cars, locomotives, shaker screens, and tanks. Get rid of old galvanized iron buildings, and other unusable or obsolete structures.



AXLES, RAILS, WHEELS . . . One length of narrow gauge rail may provide enough steel scrap for four 500-lb. bombs. Scout up rusty, cobweb-covered bearings and coupling links. Don't assume that *anything* is useless—let salvage experts decide.

CUTTERS, LOADERS, DRILLS . . . Broken-down machinery or parts are valuable scrap. Search abandoned shafts for scrap possibilities. It means money to you and munitions to our fighting forces. Every ounce of metal you ignore helps Hitler!

WIRES, TRANSFORMERS, COILS . . . Lots of electrical apparatus is still kicking around because someone thought it might be needed "some day." Today's the day! Old commutators and motors yield tin, steel, copper, brass, lead.

BOLTS, SPIKES, RIVETS . . . Don't miss a single bet—don't pass up a single cotter pin. Old chains, odds and ends of every sort . . . if they're scrap, they're useful. Remember three rail spikes equal a deadly hand grenade!

STEEL OIL DRUMS, CABLES . . . Nothing is too small or too big to be valuable. A 50-lb. steel barrel furnishes scrap enough for a .50 calibre machine gun. And not only metal, but old Manila rope, rags, rubber are badly needed. Get behind the scrap drive today!

HERE'S WHAT TO DO... Appoint one man as Salvage Manager for your organization. Give him authority to *act*—to condemn old equipment, to move material, to collect scrap of all kinds. Have him separate all scrap by type. Then move it promptly through your regular scrap dealers. Don't wait—start rounding up scrap *now*—and keep it moving until the war is won!

THROW YOUR SCRAP INTO THE FIGHT !

This message approved by Conservation Division

WAR PRODUCTION BOARD

This advertisement paid for by the American Industries Salvage Committee (representing and with funds provided by groups of leading industrial concerns).

(Midnight on the Albany Post Road, as the big Mack, "Honeygirl," rolls back onto the job out of an all night eatery. Sketched from Life by Peter Helck.)

How can you beat it?

THE VERY FIRST MACK ever built stayed in service for 17 years. The ninth Mack, built in 1901, is still in running condition, although retired after a million miles of service. Right now, 7 of every 10 Mack trucks built 10 years ago are still on the job. How can you beat a record like that? Where else can you find trucks equal to these? The answer's simple —*you can't!* From one ton to forty-five tons, a Mack is your *best* truck in the end because a Mack is *more* truck to begin with!

Mack Trucks, Inc., Long Island City, N. Y.

Plants at Allentown, Pa., New Brunswick, N. J., Plainfield, N. J.; Factory branches and dealers in all principal cities for service and parts.

Mack

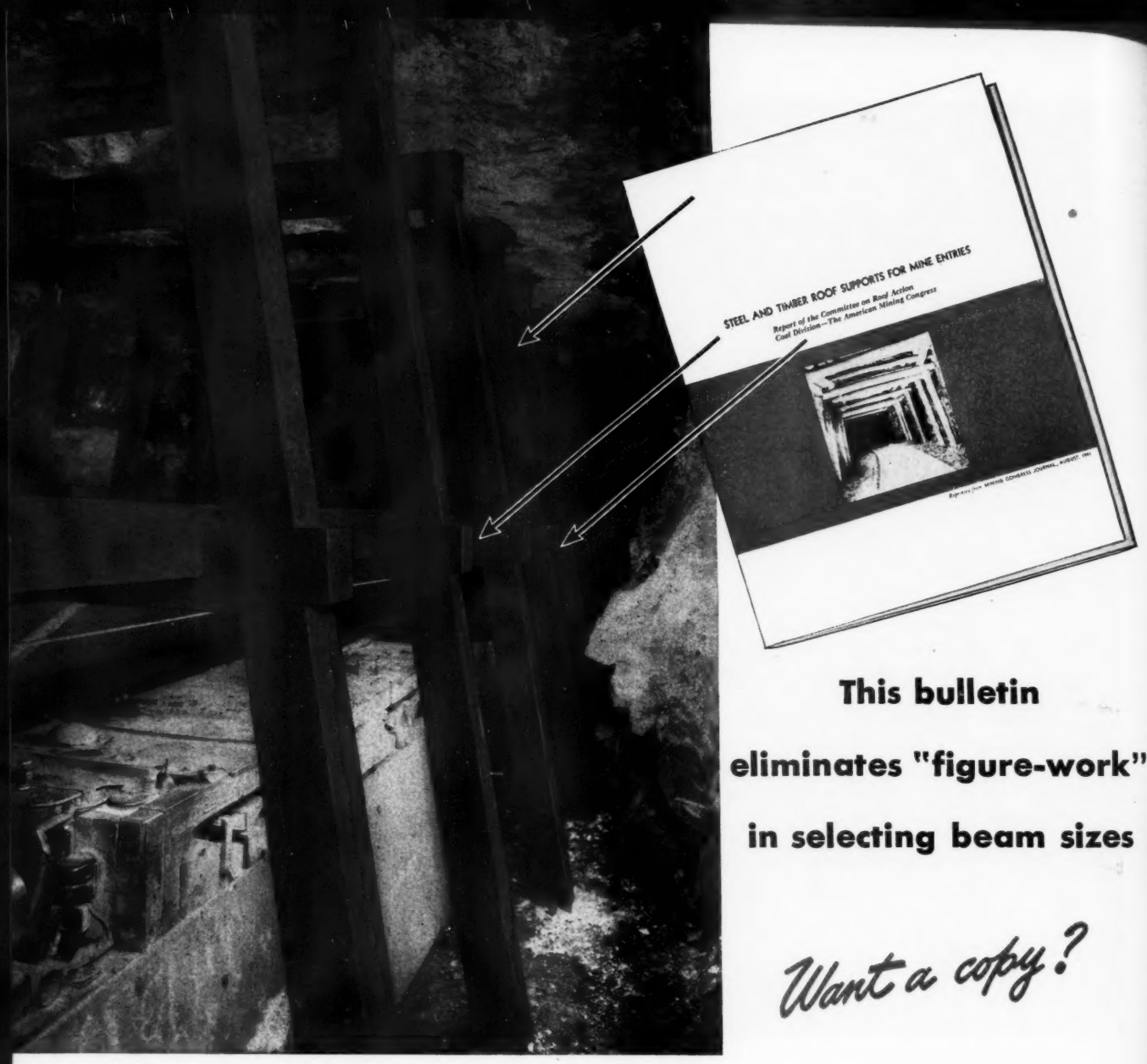
TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY... IF YOU PLAN TO GET ONE, YOU'RE WISE!


STEEL AND TIMBER ROOF SUPPORTS FOR MINE ENTRIES
Report of the Committee on Roof Action
Coal Division—The American Mining Congress

This bulletin eliminates "figure-work" in selecting beam sizes

Want a copy?

Pressure-treated lumber can take over your roof-support jobs quickly—safely—economically—and *permanently.*

The picture shows a few of 125 pressure-treated timber-sets in a double-track heading. Timber was framed to close tolerances, marked, pressure-treated, and speedily assembled to exact fit without any further cutting.

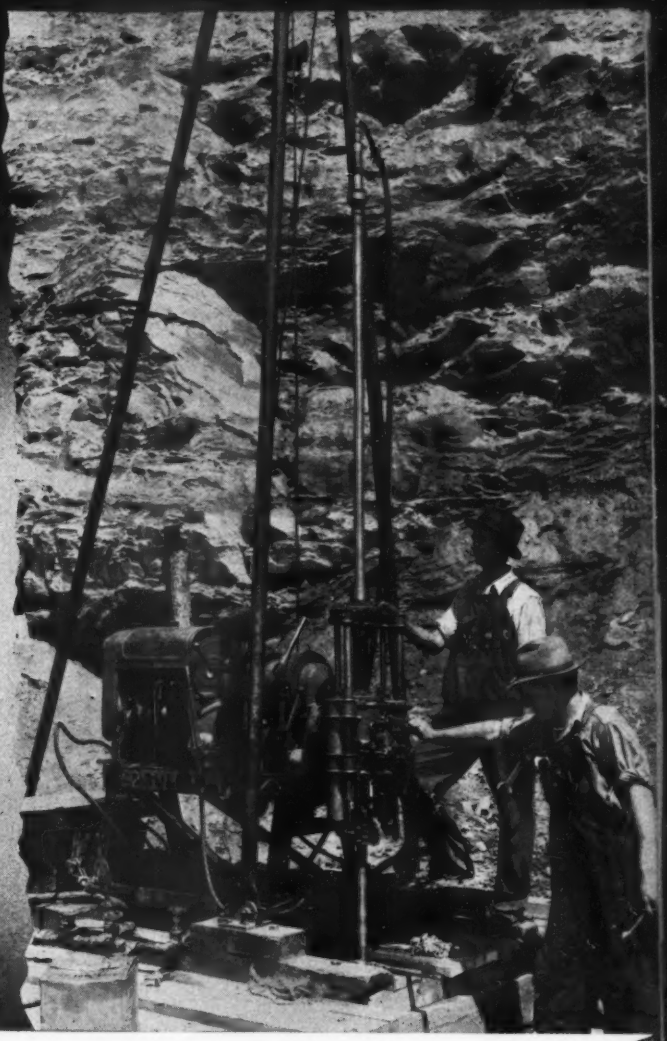
A study completed recently by the Committee on Roof Action of the American Mining Congress is of unusual value now. It arranges in groups the sections and shapes of wood and steel beams that will have a supporting strength of not less than the uniformly distributed load shown in the tables. The data eliminate computation in selecting sizes of beams of approximately similar capacities.

We will be glad to send you a copy, if you will drop us a line.

KOPPERS COMPANY
WOOD PRESERVING DIVISION
PITTSBURGH • PENNSYLVANIA

Use **KOPPERS** products

SULLIVAN AT WORK!



LOCATING STRATEGIC MINERAL DEPOSITS!

The unprecedented demand for strategic minerals, coal and vital ores means that every possible source of supply must be made available for immediate production. SULLIVAN Core Drills are saving valuable time by locating these vital deposits and making an accurate record of their value and extent.

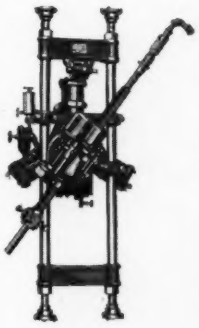
This is an exacting job, requiring high-speed, dependable equipment. It's a job that's tailor-made for SULLIVAN Core Drills, as swift, constant operation is built right into these machines.

Pictured at the right is a No. 12, one of the several SULLIVAN Core Drills designed for this important type of work. The No. 12 incorporates such features as direct drive; anti-friction bearings; alloy steel gears and shafting; planetary hoist and 3-speed transmission. Capacity, with "EX" fittings, 900 feet.

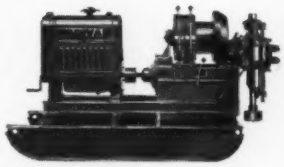
SULLIVAN MANUFACTURES A COMPLETE LINE OF DIAMOND CORE DRILLS

The No. 6, smallest of the Sullivan core drills, is available with air or electric drive. Underground capacity, 300 feet, with "EX" fittings.

The No. 7 is designed especially for surface exploration work. Capacity 500 feet with "EX" fittings.



The No. 22 drills more core per day, every day, because it is built for modern high-speed drilling. Completely new design has increased the drilling rate by 50%. Rated at 1500 feet, with "EX" fittings, gas or electric power.



The No. 22 HD is a sturdy, heavy-duty drill with a rating of 1750 feet with "EX" fittings. May be dismantled for easy transporting.

CAPACITIES FROM 250 TO 12,000 FEET!

SULLIVAN Machinery Company

ROCK DRILLS • AIR COMPRESSORS
SCRAPER HAULERS • HOISTS • LOADERS
CORE DRILLS • CORE DRILL CONTRACTING

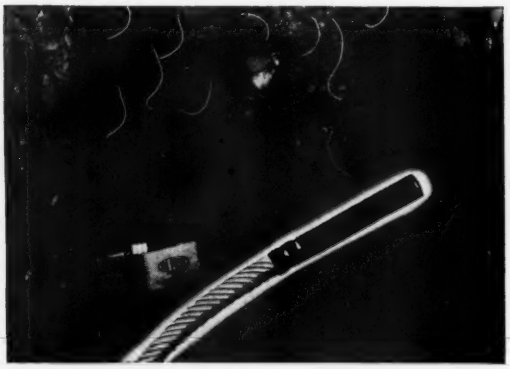
Birmingham, Boston, Butte, Chicago, Dallas, Denver, Duluth, El Paso, Huntington, Knoxville, New York, Pittsburgh, St. Louis, Salt Lake City, San Francisco, Scranton
and in Principal Cities Throughout the World

EXECUTIVE OFFICES: MICHIGAN CITY, IND.

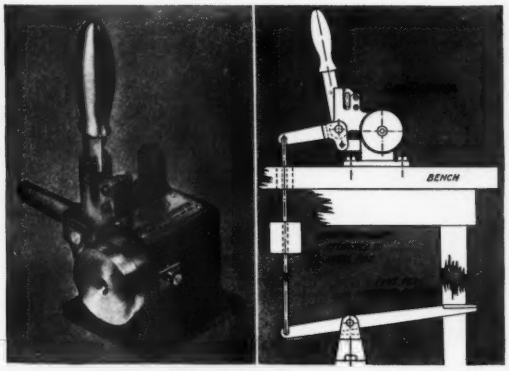
Associated House — CANADIAN SULLIVAN MACHINERY CO. LTD. DUNDAS ONT.

1 "VENTUBE" *will carry good air to wherever it is needed in a mine, lowering the air temperature and quickly displacing fumes and dust after blasting. Thus "Ventube" is not only an important safety factor but also lowers costs and speeds production by reducing time between blasts.*

Many mines carry an extra portable blower and a supply of "Ventube" just for emergency work. In an emergency "Ventube" can be laid on the floor as fast as a man can walk. Coupling it is the work of only a few seconds and "Ventube" is ready to deliver air as soon as this is completed and the motor started.



2 DU PONT BLASTING CAPS *crimped to the fuse with the Du Pont Superior Crimper make the most dependable combination for cap and fuse blasting. Over 3,700,000,000 fuse caps have been purchased from Du Pont since 1897.*



3 THE SUPERIOR CRIMPER *is a bench type cap crimper equipped with a fuse cutter. It can be arranged for operation either by hand or by a foot treadle. The joint made between cap and fuse is even more waterproof than the fuse itself.*

DU PONT EXPLOSIVES

BLASTING AGENTS AND ACCESSORIES

5 DU PONT AIDS TO SAFER MINING

...and faster, lower-cost production

EACH one of the du Pont products described here—including DuPont "Ventube", Blasting Caps, the Superior Crimper, Powder Bags, and "CZC"—offers a way of doing a mining job in a safer way, while in most cases speeding operations and cutting costs.

"Ventube" is du Pont's registered trade mark for its flexible, rubberized ventilating duct. It offers the most efficient and economical means of ventilating "blind ends", wherever they may be located. Installations of "Ventube" are lower in first cost, more easily and economically installed, take up less room and deliver more air than any other type of tubing.

Du Pont Blasting Caps are noted for their absolute dependability—have detonated more blasts than the caps of any other manufacturer. The Du Pont Superior Crimper, also described here, provides an efficient way of making a waterproof joint between cap and fuse *without* the use of a waterproofing compound.

"CZC" is du Pont's name for its Chromated Zinc Chloride preservative for ties and timber. "CZC" renders timber both decay resistant and fire retardant. It leaves wood clean and safe to handle, with no odor foreign to mines.

Inquiries should be addressed to E. I. du Pont de Nemours & Co. (Inc.), 2506N, Wilmington, Del.

4 **"CZC" TREATED TIES** *(above) retain a firm rail bearing surface and improved spike gripping power for many years, preventing rail spreading and other track failures. They may be used over and over again and increase safety and decrease maintenance costs. "CZC" also gives ties and timber a high degree of fire resistance.*

5 **DU PONT POWDER BAGS** *(left) are made of the same sturdy material used in "Ventube". Bags are non-conductive, by actual test, at voltages many times those normally encountered in mines. They are available in various sizes.*

VENTUBE
FLEXIBLE VENTILATING DUCT

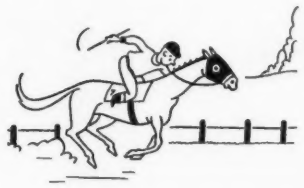
CZC
WOOD PRESERVATIVE

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living . . . Through Chemistry

Keeping Peaks Down.

When haulage units are powered by alkaline batteries it isn't necessary to add the haulage load to the hoisting load—the battery charging can be done at off-peak hours. This means a lower maximum demand and a higher utilization of existing distribution lines.



Lean Horses are Popular.

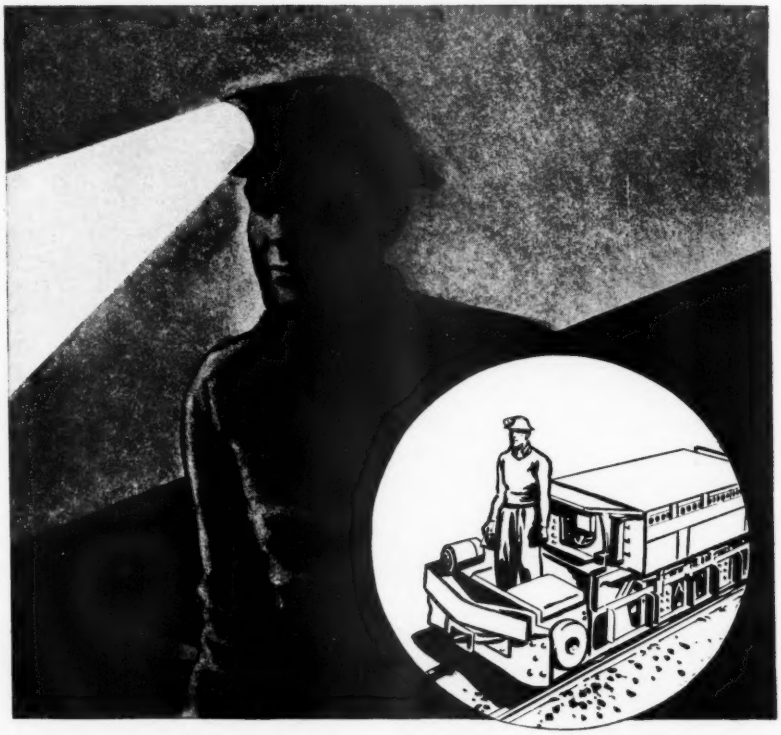
"Give me a lean horse for a long race," was never truer than when applied to gathering and tramming. While Edison Alkaline Batteries weigh the least, they are also the strongest and last the longest. This is not a *claim*. It is a matter of electrochemical principle and structural design. Edison Batteries are the only alkaline batteries made in the U. S. A.

Maintenance Simplified.

Untrained men can do a lot of damage just "learning how." With alkaline batteries, maintenance runs the least risk—they have even been charged in reverse. And, they are as rugged physically as they are electrically—because they are built of steel. In few services do batteries take as much punishment as in mines—reason in itself for preferring steel construction.

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

THIS POWER must not fail



The man in the factory is at the mercy of the man in the mine. If the critical materials don't come through—neither do the tanks and guns. But the industries and mines have an ally in common. The vital material-handling systems of industry are the battery industrial trucks; more than 50% are powered by Edison Alkaline Batteries.

Vital to transportation in mines are the locomotives and shuttle cars—where again the alkaline battery is proving its worth in getting the war production through. Thomas A. Edison, when he invented the alkaline storage battery, contributed more to winning World War II than even he could have guessed.

Yes, alkaline batteries are the most dependable portable power the world has ever known. Electrically, chemically, structurally, they are made to order for today's stringent demands. Dependability is the reason for their success in mines, on railroads, throughout industry and aboard ship.

MINING NEEDS THE DEPENDABILITY OF

Edison Alkaline BATTERIES

A JOURNAL FOR THE ENTIRE MINING INDUSTRY—PUBLISHED BY THE AMERICAN MINING CONGRESS

MINING CONGRESS JOURNAL

HARRY C. CHELLSON
Editor

Vol. 28 SEPTEMBER, 1942 No. 9

REALISM NEEDED ON THE HOME FRONT

IMAGINE the heat of anger and anguish a soldier, sailor or marine would experience in battle when he runs out of critical fighting supplies. "Not enough," "Too little, too late" are words that would flash through his mind and scar his soul and sear his memory, as every second of his precious time ticks on. Every American shudders at the thought of having a son or loved one experience such a fate in this world struggle for our cherished way of life.

So far in this war the enemy has damaged our supply lines that bring copper, zinc, chrome, manganese, tungsten, tin, mica and other essential raw materials for war production. Plants have been shut down because of insufficient raw materials and the Nation's metal mining industry has made the headlines with discussion of a copper shortage.

Early in the year OPA announced a premium price plan for metal mines, based on production quotas. The purpose of the plan is to speed the output of copper, lead and zinc. Today there are small producers on the verge of shutdown because they have experienced unusual difficulty in receiving their payments. Many operators with newly reopened mines are threatened with shutdown in spite of the premium prices because they cannot pay the high wages existing in other industries. So-called economists and legal-minded planners in the OPA study the balance sheets of mining companies and apparently ignore the necessity of granting higher metal prices where needed. Apparently they are not sufficiently realistic to understand that metal mining is a highly technical and involved industry that cannot produce at maximum efficiency for the war effort when precious time is lost over discussing how much this or that mine will receive for its metal. The economics of mining or any other industry cannot be one-third free enterprise, one-third OPA and one-third Government finance.

People desiring to invest funds for the production of our needed raw materials are discouraged by the trend of legislation, taxes and red tape that affects mining. The industry therefore finds itself in a strange dilemma—on the one hand a feverish demand for metal, and on the other, red tape keeping metal resources in the ground instead of "all out" on the way to the war fronts.

Since World War I the nation's business and economic structure has become so enmeshed in numerous laws and regulations that we find much New Deal stumbling along avenues of the war effort. Stark realism and action will remove hurdles, obstructions and stubbornness on the fighting front and the same realism must exist at home.

Among men giving substantial service in Government circles is Senator Johnson, of Colorado. A member of the tax-framing Finance Committee, he is patiently explaining to doubting Thomases what is needed for the metal mining industry to do its best job in the war effort.

The appeal of Senator McCarran, of Nevada, to the Senate Finance Committee is an example of sober action desired in the mining industry to unleash shackles that keep our strategic and critical minerals in the ground. He said, in part, "We must look for metal production at home, and in order to look for production at home we must encourage the investment of private capital, and in order to encourage the investment of private capital in this all-essential industry we must lighten the tax burden, and relieve them of the intricacies and conditions that now retard their investment."

Dr. Wilbur Nelson, special assistant to A. I. Henderson, of OPA, also pointed out: "The War Production Board is concerned with the output of the nation's mines and is anxious that nothing be done which will interfere with the production of minerals, essential to the war program. We realize, of course, that you are aware of the importance of increasing mineral production and that you are ready to give the WPB every assistance in its efforts to that end. The complexity of the mining industry is such that I do not believe that it would be practicable for the Government to undertake the exploration and development of these mines. It follows that we must and do rely on the mining companies to find and recover the tremendous quantities of metals that are needed for the guns, tanks, and various other things, factories, and ships."

Precious time ticks on. Meanwhile soldiers back from the fronts observe quibbling, pussyfooting and pondering, and no doubt they wonder if in 1943 and beyond, any of their buddies will experience "Too little, too late."

WOMEN IN THE MINING INDUSTRY

A MAJOR manpower problem of the coal and metal mining industry is the loss of men to higher paid Government jobs and men called into the armed services. Absenteeism is also a problem but this "disease" is apparently more malignant in coal than in metal. The two surveys we have presented on the labor supply situation in coal and metal mining, respectively, demonstrate that mining executives are faced with a critical problem in obtaining sufficient labor for maintaining peak production. Measures to help this situation are expected to be announced soon by Government agencies.

We urge mine operators to read carefully what Major General Hershey points out on page 22, regarding manpower. He suggests what steps should be taken to inventory men in industry so war production will not decline. General Hershey points out that executives also should appraise the available man and womanpower situation in their communities and should institute training of women wherever they may replace a man. This already is being done by some metal and coal mining companies, and results to date clearly demonstrate that many women have the ability and capacity to perform certain jobs above ground in the mining industry formerly done by men. There is little doubt, therefore, that they will carry banners of achievement in these two raw material industries that comprise the nation's vanguard in the industrial march toward ultimate victory.

MINING AND MILLING TUNGSTEN ORES at Boriana

This small mine in Arizona is producing a strategic metal from a group of narrow veins by selective mining. A modern flotation plant successfully treats the company ore as well as that bought from other small nearby mining operations.

By W. H. MUNDS
Resident Manager
Molybdenum Corp. of America

THE BORIANA MINE of the Molybdenum Corporation of America is situated on the crest of the Hualapai Mountains near Yucca, Ariz. An unimproved road connects the mine with the railroad at Yucca, and trucking supplies in and concentrates out is not a difficult task.

Tungsten ores, consisting of wolframite and scheelite, occur in narrow quartz veins near the center of a schist belt which varies in width from 500 ft. to one-half mile and is several miles long. There are four series of veins called Nos. 1, 2, 3, and 4 veins. A large percentage of the ores extracted have come from No. 2 and No. 4 veins. The main ore chute on No. 2 vein varies in length from 300 ft. on the surface to more than 1,500 ft. on the seventh level and pitches at an angle of 50 degrees to the northeast as it gains depth. Apparently the ore chute on No. 4 vein is about 300 ft. long on all levels and pitches at about the same angle. Chalcopyrite and arsenopyrite, bearing some copper and phosphorous, also occur with the tungsten ores in these veins. The veins strike northeast by southwest and pitch to the east about 80 degrees, similar to the schist. The schist is bounded on the east and on the west by igneous granite and fingers into a quartz monzonite on the northeast. Whether the veins enter into this quartz monzonite at depth to any appreciable distance has not been determined.

The main entrance to the mine is near the center of the claims on the fifth level, which is also the level of the surface plant and the top of the ore bins. This entrance is to a tunnel, or drift, running along the veins. At present all ores being mined, except lease ores, come from below the fifth level.

At a point 2,900 ft. northeast of the portal a vertical winze 330 ft. deep services the sixth and seventh levels, giving room for a pocket and chutes below the seventh level. The main, or cage compartment, of this winze is 4 ft. 8 in. by 4 ft. 8 in. in the clear. The manway compartment is 4 ft. 8 in. by 3 ft. in the clear. An 80-hp. electric hoist on the fifth level services the main compartment. Sinking to the eighth level is now being carried on from the seventh level through the manway compartment, by means of separate 40-hp. electric hoist and ore bin on the seventh level. This winze is in schist and makes very little water. All water below the fifth level, of which there is now about 40 gallons per minute, flows into a sump on the seventh level and is thence pumped to the fifth level, from whence it flows by gravity to the mill reclaim water tank.

From the 40 station on the fifth level raises connect this level with the surface for ventilation and escape purposes. From 40 winze on the seventh level a drift has advanced 1,700 ft. northeast along No. 2 vein to the quartz monzonite contact. Most of this drift is in commercial ore. Practically all the water made on this level comes from this contact.

From a point 1,000 ft. northeast of 40 winze on the seventh level there is a two-compartment raise to the fifth level, for escape and servicing purposes.

Due to heavy side pressure and swelling ground, all drifts, raises and winzes

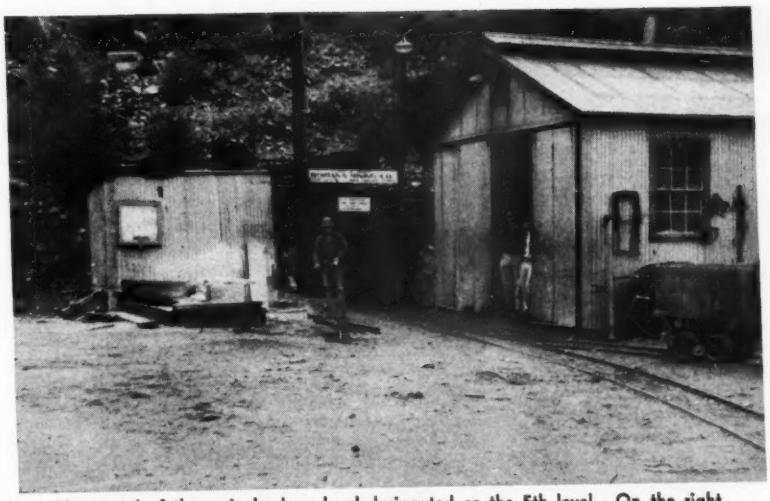
Tungsten ore is hauled from the No. 5 tunnel level to the ore bins in the upper right hand corner and crushed ore is conveyed up the enclosed incline to the 75-ton flotation plant

must be timbered and lagged. The cross-cuts stand well without timber Oregon pine, or fir, 8 x 8 in. is used to timber the winze, with 2 x 10 in. Couer de Alene lagging; 3 x 8 in. notched cribbing is used for the chutes and manways in the stopes; round peeled stulls are used for timbering the drifts, with 2 x 10's and 2 x 12's for lagging.

The No. 2 vein consists of quartz stringers varying in width from 1 in. to 1 ft. and No. 4 vein, which is 150 ft. east of No. 2, generally consists of one stringer from 4 in. to 12 in. wide. Where the widest quartz appears there also the best values in tungsten generally appear. These two veins are worked at the same time on any one level by means of a main drift on the No. 2 vein with cross-cuts and subsidiary drifts on the No. 4 vein. Ordinarily a pillar about 15 ft. thick is left above the timbers on each ore body with raises through this pillar at intervals of 25 ft. Fifteen feet above the drift a sub-level is run before starting stoping operations. From there up cut and fill stoping, using the barren schist for gob, is practiced. Generally we get more waste than is needed for fill in the stopes. This is hoisted and trammed to the surface with development waste.

When the ore is in one stringer the waste is shot first, leaving the ore on the wall to be stripped and sent out to the mill. This method tends toward better stope extraction and cleaner ore. When the ore is in two or more stringers, boards are placed on the stope bottoms, the back is drilled and shot onto them, then the ore is sorted out for shipment to the mill. Nearly all stoping is done with drifter machines, breasting the ground with flat holes.

Ore and waste to the surface and supplies into the mine are carried on 16-cu-ft. mine cars pushed or pulled by electric battery powered motors. We have one mucking machine. Other development waste is mucked by hand. Air for the whole plant is furnished by three electric-driven compressors. Water for camp and mine use is pumped from a well one mile below the camp. All power is electric, supplied from Boulder Dam. All drill steel is fitted for detachable bits. To resharpen, these bits are hot milled and retempered in our own shop. We get about six uses out of a starter bit. A machine shop and saw shed at the fifth level portal are maintained for repairs, timber framing, etc.



The portal of the main haulage level designated as the 5th level. On the right is the blacksmith shop where detachable bits are hot milled

Buildings near the 5th level portal. In the foreground are the ore bins for receiving company as well as custom ore

A view of the flotation section of the ore treatment plant which is supervised by the operator

All ores—mine run, lease ores and custom ores—are weighed and dumped into a six-compartment ore bin at the mill. From the different compartments the ore is drawn onto a 24-in. conveyor belt, having a magnetic head pulley to take out tramp iron, sent over a ¾-in. grizzly through a 9 x 16 in. jaw crusher onto a 16-in. conveyor belt and over another head pulley at the top of a 75-ton fine ore bin. Here, if desired, a sample is cut on any ore being crushed by means of a hand splitter. From the bottom of the fine ore bin ore is drawn out onto a short 16-in. feeder belt, thence into a 24-in. gyrosphere, which is in closed circuit with an elevator and two vibrating screens having 8-mesh screen cloth.

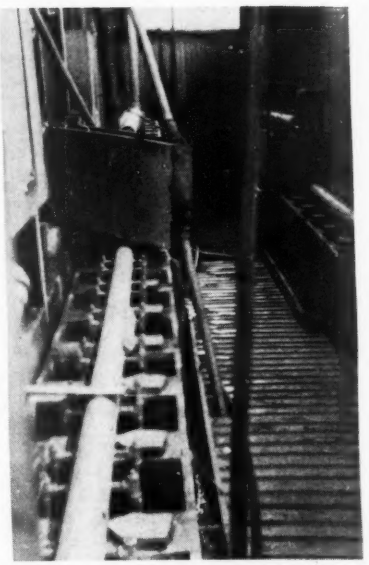
All ore is ground wet through 8-mesh, and flows to a sump. From this sump a 2-in. sand pump pumps it to a 9 x 20 ft. thickener. From this thickener the thickened pulp is drawn off by means of a spigot to a 6-pocket hindered settling classifier. The classifier overflows to a 10-ft. cone. Thus, there are recovered seven sizes for four sand tables and three slime tables.

These tables make a finished table concentrate, a middling and a tailing. The tailing runs by gravity to a flotation machine, where chalcopyrite left there by the tables is floated off, thence it runs by gravity to a sump, from where a 3-in. sand pump brings the tailings to an Aikens classifier, which desands it, discharging the finer product to a 7 x 30 ft. thickener and the sands into a tails launder. From the thickener the thickened tails are drawn at 40 to 50 percent solids by a 3-in. diaphram pump and discharged into the same tails launder. The overflow water from this thickener is passed into an 8 x 30 ft. thickener for further clarification, thence to the mill reclaim water tank, from which a 6 x 8 in. triplex pump pumps it to a 20,000-gallon mill steady head water tank.

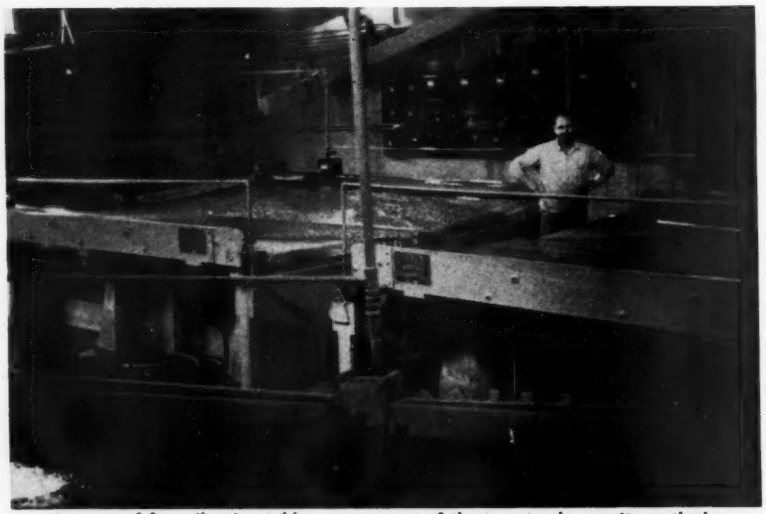
The table middlings all flow into a launder, thence to a sump, from which a 2-in. sand pump pumps them back to the 20-ft. thickener at the head of the mill for retabling.

The concentrates containing 50 percent tungsten trioxide, 2 percent silica and from 5 percent to 10 percent copper, are run into a storage tank. From there they are drawn off as desired into a small rake classifier, which is in closed circuit with a 2 x 4 ft. rod mill. The coarse dewatered concentrates are fed into this rod mill and ground to 88 percent through 200 mesh. This grind is a very particular operation because the wolframite is mixed so finely with some of the arsenopyrite, which carries some copper, that a fine grind is necessary. On the other hand, too fine grinding results in smearing tungsten on some of the chalcopyrite to the point that it will not float in the 5 percent solids resulting from this operation.

From the classifier the pulp conditioned in the rod mill with thiocarbanolide and soda ash is pumped to a conditioner with suitable amounts of reagents (301, 633 and B23) and thence flows to a 12-cell rougher flotation machine, where all copper is floated off to .04 percent. This float also gets arsenopyrite, which carries phosphorous. The tailings from this rougher machine flow into a 6 x 6 thickener, where the tungsten is thickened and pumped out through a 2-in. diaphram pump into a filter and thence drops to a steam drier pan below. There it is dried to 2 percent moisture and sacked in 100-pound bags for shipping. These tungsten concentrates average 70 percent tungsten trioxide.



Another view of the flotation cells showing the discharge ends of the rake classifier



A group of four vibrating tables recover part of the tungsten by gravity methods. The operator has a conveniently arranged panel of electric control switches on the wall

The rougher concentrates flows to a 5-cell cleaner flotation machine and are cleaned of tungsten, which returns to the classifier through a pump. The cleaned froth flows to a 6 x 8 ft. thickener. The thickened copper concentrates are drawn off by means of a 2-in. diaphram pump into another filter and drop into a storage bin, from which they are shipped in bulk containing about 8 to 10 percent moisture.

We are now preparing to install a set of 14 x 30 rolls in the grinding circuit as a secondary to the 24-in. gyrosphere. We expect this to reduce grinding costs, reduce sliming and increase capacity from five tons per hour now to eight and one-half tons per hour then.

Due to great amount of timber necessary to hold the ground, high maintenance costs, and narrow veins, mining costs in this kind of mine are much higher than average. Milling costs are about the same per ton as any other normal milling operation of 100 tons capacity.

METALLIZING—A Modern Aid in Maintenance

Interest expressed by readers regarding the relatively new practice of metallizing the worn parts of equipment used in the coal and metal mining industries, makes this article a timely contribution for the wartime problem of preventive maintenance. Data and drawings have been supplied through the courtesy of the Metallizing Engineering Company of New York, N. Y., from its recently published manual on this subject.

THE bond between the sprayed coating and the base material to which it is applied depends on the following factors: (a) the proper roughening of the base material to form keys or openings for the sprayed metal to penetrate, thus binding or keying the two metals together, (b) the base material must be clean and free from oxides, oil, water, etc., which form a layer between the sprayed metal and the base material, making it impossible for them to come into the intimate contact required for proper bonding, (c) the sprayed metal must be finely atomized, so that the molten particles are small enough to penetrate the smallest openings of the prepared base material, and so bond to it.

The above three factors should always be given careful consideration, since they are the basis of sound metal spray work so far as bond is concerned, and obviously the bonding of the sprayed metal to the base material is one of the most important features of any job.

Blast cleaning, using sand, steel grit, or some other recognized means are the most common methods of preparing metal surfaces for spraying. Blast cleaning results in a thoroughly roughened and clean surface, ideal for metallizing. Sand is recommended for all work where the blast material cannot be recovered, such as bridges, and other large structures.

Steel grit, being tougher than sand, is much more desirable for blast cleaning. It also has the advantage that it can be used over and over again, which results in lowered costs.

Preparation of Shafts by Metallizing

When building up shafts, bearing surfaces, rolls, etc., it is almost always necessary to undercut the surface to be built up, both in order to have the correct thickness of sprayed metal on the finished job, and in order to properly dovetail or key the ends of the coating.

There are four steps in the coating of any shaft as shown in Figure 1. First, undercut the surface to receive the coating, second, prepare the surface for metallizing by either blast cleaning or by a special tool described later, third, metallize the shaft with the correct material for the job, fourth, finish the coating by machining or grinding.

The depth to which the work should be undercut is determined by two factors—(1) The size of the shaft, and (2) the amount of wear to which it will be subjected before it is removed from service.

For convenience we will call the minimum thickness of coat (which is determined by the diameter of the shaft) minimum coat thickness, and the amount of metal which must be applied to take care of wear after the piece is put in service wear allowance. Minimum coat thickness should be .010 in., on the radius for a shaft 1 in. or less in diameter. Add .005 in. for each additional inch in diameter until a maximum of .040 in. is reached, thus:

Diameter	Minimum Coat Thickness
1 in. or under	0.010 in. on the radius
1 " to 2 "	0.015 " " " "
2 " to 3 "	0.020 " " " "
3 " to 4 "	0.025 " " " "
4 " to 5 "	0.030 " " " "
5 " to 6 "	0.035 " " " "
6 " or over	0.040 " " " "

The above table applies to all work except where the piece is being built up to restore a press fit where the minimum coat thickness may be .010 in. on the radius regardless of the diameter of the shaft.

Wear allowance is the amount of metal which must be added to take care of the wear which will be expected in service. This must be determined for each individual job, and

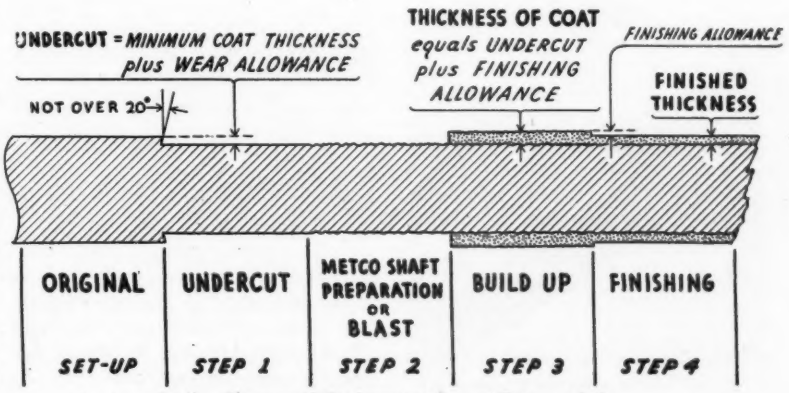


Fig. 1. Diagram of the four steps in metallizing a shaft

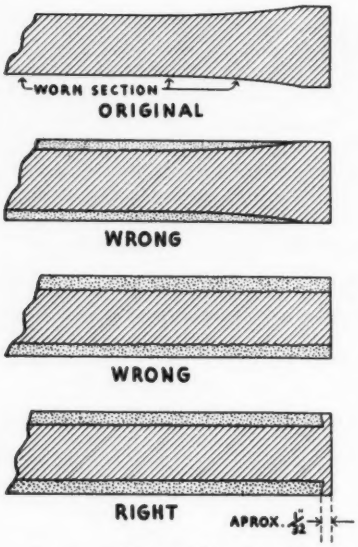


Fig. 2. When possible, the ends of the shaft should be undercut and dovetailed. If this is impossible, use method shown in Fig. 3

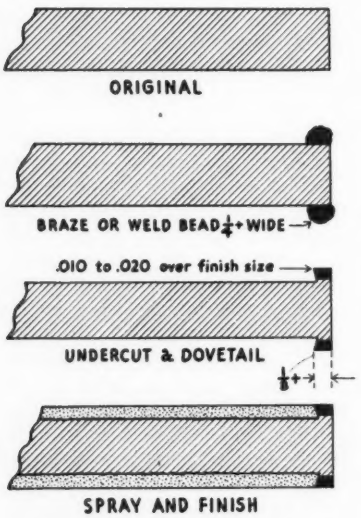


Fig. 3. The steps in metallizing a pressure plunger which is worn at the end so it cannot be dovetailed

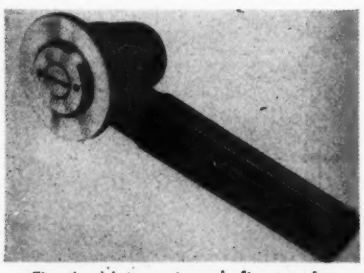


Fig. 4. Metco rotary shaft preparing tool

may vary from 0.001 in. to 0.250 in. When in service the piece should be allowed to wear to the point where the minimum coat thickness remains intact.

Undercut equals minimum coat thickness plus wear allowance.

Finishing allowance—Minimum thickness and wear allowance are based on the thickness of the finished coating, and do not take into account the additional metal which will be required for finishing. If good atomization is being obtained, a finishing allowance of 0.015 in. on the radius for a 1-in. diameter shaft plus 0.003 in. for each additional inch in diameter up to a maximum allowance of 0.030 in. on the radius will be sufficient. If the atomization is coarse, or if the coating is uneven, an additional finishing allowance should be made to allow for these factors. Where finishing is to be done by grinding, allowances for finishing may be slightly smaller.

When a shaft is unevenly worn it will save time and material to step the undercut section in order to avoid the extra expense of applying more metal than is necessary.

Since all sprayed metal has low tensile strength, the sprayed metal should be keyed or dovetailed into the base material. The coating should never be allowed to taper off to a feather edge (Fig. 2). Where the worn section of the shaft extends to the end of the shaft so that it is impossible to dovetail the coating, the finished coating should be rounded at the end. Where the end of the piece must work against pressure as in a pump plunger or hydraulic ram, it is always necessary that the coating be dovetailed at the pressure end. If the piece is worn at the end (an unusual condition since such pieces are usually worn only at the packing section), it is necessary to braze or weld a bead around the end and then dovetail in the brazed or welded metal (Fig. 3). The same principles and rules outlined above for shafts also apply when preparing or spraying inside diameters.

The Metco rotary shaft preparing tool (patent pending) is used in this new method of bonding metallized coats to machine element parts. The tool, itself, may be used directly on a smooth surface to produce a rough surface somewhat similar to that obtained by grit blasting. However, the manufacturer recommends that it should be used ordinarily as part of the complete method. This method combines the principles of dovetailing and adhesion to a roughened surface. The bond thus produced will practically equal the tensile strength of the metallized coat itself.

The shaft should be mounted in a lathe and turned undersize at the section to be metallized so as to clean up the worn part, and to provide for the proper thickness of metallized coat. As previously outlined, there are two steps in the actual preparation of the surface.

First, groove the shaft in a lathe with a tool bit. A standard ⅛-in. cut-off tool blade, ground on the side to give a thickness of from .045 in. to .050 in. and rounded on the end, makes a good tool for this purpose.

The grooves should be cut .025 in. deep, and may be made either by using the lathe lead screw and cutting a continuous thread, or by simply cutting a number of separate grooves. If the thread feed is used it should be set at 16 threads per inch for all materials except cast iron for which 14 threads per inch should be used. When cutting separate grooves, space them so that the ridges between the grooves are approximately .015 in. wide, except for the cast iron which calls for ridges .025 in. wide. Unless an exceptionally strong bond is required, it may only be necessary to cut a few grooves at the end of the undercut section as described later.

Where possible, undercut the shoulder at both ends of the section to be metallized. If this is done, allow a space of 1/32 in. between the undercut shoulder and the edge of the first groove, otherwise the metal may not fill the groove. Where it is impossible to provide a shoulder at the end of the section to be metallized, stop the grooving just short of the end of the shaft. A ridge of at least 1/32 in. should be left at the end.

The second step is to apply the Metco rotary shaft preparing tool. This tool is mounted in the tool post with the toothed wheel square with the work. It is then run back and forth over the shaft to roughen the surface on top of the ridges and to spread the ridges, thus forming dovetail grooves. The spindle speed should be such as to give a surface speed of from 200-300 ft. per minute, and a feed of about .020 in. per revolution should be used. Higher speeds and feeds may be used for some materials, as may be found by experimenting. The tool should be fed into the work with a firm pressure and then

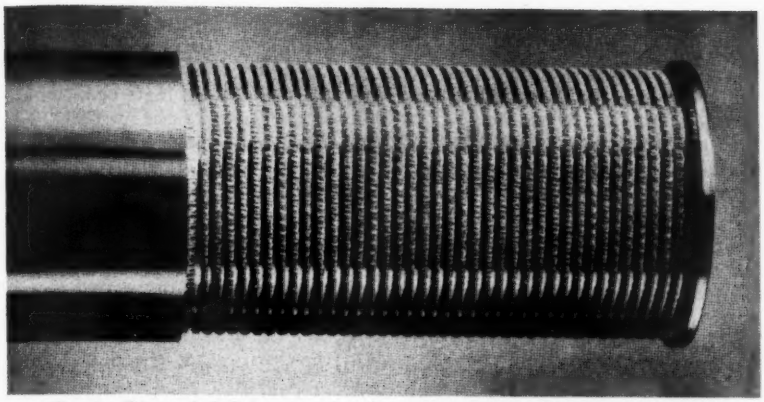


Fig. 5. This steel shaft is grooved and prepared with the Metco preparing tool

For an inexpensive method of obtaining a fair bond between a metallized coat and a shaft or similar part, the Metco rotary shaft preparing tool may be used directly on the smooth surface without grooving. This procedure is particularly recommended for production jobs where cost is important and where tests are justified to determine if the degree of bond obtained is satisfactory. A bond will be obtained by this method which approximates the bond resulting from an average grit blast job.

When a dovetail cannot be formed in the base material, the best method of bonding sprayed metal to a corner is by the use of the hack saw method or slotting method to form dovetails at the corner. This can be done with either a power or handsaw, but the blade should be at least 1/16 in. thick. The most common size of light power saw blade is 0.080 in. to 0.090 in. thick (including "set") and is ideal for this operation. The width of the slot should always be greater than the depth, to eliminate any chance of the sprayed metal bridging instead of filling the slot. Cut slots into the corners with the saw, so that the slots are about ½ in. long on the side to be coated and not over 1/16 in. long on the side which is uncoated (Fig. 8). Where the maximum bond is required, or where a very heavy coat is being applied, the slots should be spaced about ¼ in. apart. For lighter coats, a spacing of ½ in. or even 1 in. will be satisfactory, depending upon the bond strength required. This

fed lengthwise over the shaft about three times. This operation should result in spreading the ridges so that the tops of the ridges are the same width as the spaces between (Fig. 5). If the ridges are too narrow, there will be insufficient dovetail; and if the ridges are too wide the metal cannot fill the grooves. The surface on top of the ridges should be as rough as possible. This roughness sometimes may be improved by making the last pass with the tool pressed very lightly against the work, and with an increased spindle speed.

It is very important that all turning be done dry and that the shaft be kept entirely free from oil and grease. If the shaft must be handled before metallizing, it should be wrapped up in paper or clean cloth before removing from the lathe.

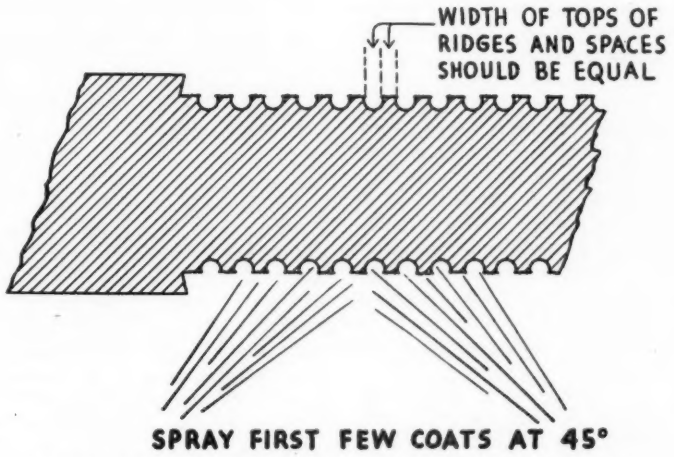


Fig. 6. Following preparation of the shaft a few coats of metal are sprayed from the gun on the shaft at an angle of 45 degrees, alternately one side to the other

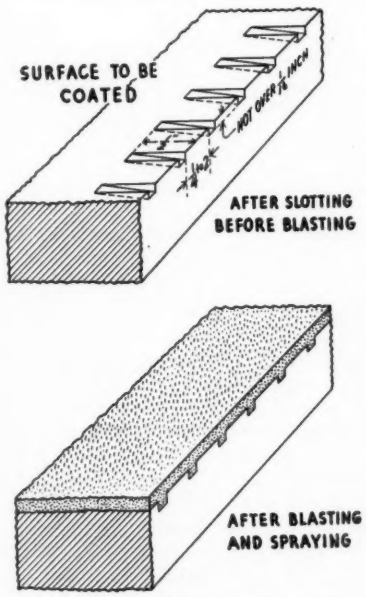


Fig. 7. The slotting method of preparing the edge of a flat surface to receive the sprayed metal

When the shaft is metallized, the first few passes should be made with the gun held at an angle of about 45 degrees to the work, alternately spraying from each side (Fig. 6), so as to deposit metal under the edges of the dovetails. After a few passes made in this manner, the gun may be mounted in the tool post holder and the balance of the coating applied perpendicular to the work.

This method produces a good bond which can be consistently obtained on any base metal soft enough to cut in a lathe. This includes the brasses, bronzes, and nickel steels on which even grit blasting fails to produce a good bond. It should be noted that this method of grooving automatically takes care of the necessary slotting around keyways and similar work.

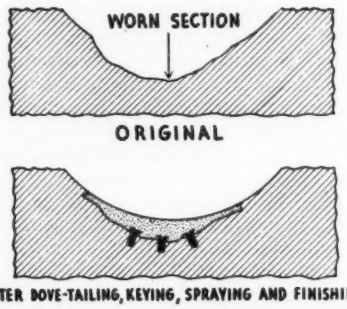


Fig. 8. The use of flathead screws or similar anchorage is sometimes available where a very heavy coating is to be applied on a concave surface

method is used in conjunction with grit or sand blasting and the slots always should be cut before blasting and blasted thoroughly.

In very rare cases it is not possible to use either of the previous methods, yet additional anchorage may be required. In such cases, flat head screws or some similar anchorage can be placed in the base material so the sprayed metal will anchor around them. Such screws should always be blasted thoroughly after they have been inserted and before spraying (Fig. 9). The screws should be of substantially the same metal as the metal being used for coating.

In the preparation of blow holes and defects in surfaces, the same general principles apply; i.e., the coating should be dovetailed or keyed at the edges, and the surface to be sprayed must be clean and rough. The spot to be filled-in should be chiseled out and the edges undercut all the way round. The section should then be grit blasted thoroughly and sprayed. Care should be used to always open the hole large enough so that the sprayed metal can be applied without bridging over (Fig. 11).

Cracks should be opened up with a chisel, and dovetailed as much as possible (Fig. 12). The entire surface should then be grit blasted. It is sometimes advisable to drill a small hole at each end of the crack to keep it from progressing further after spraying. This is necessary in only about 10 percent of the cases and can be determined by the nature of the crack and the piece being repaired.

Spraying Technique is Acquired by Practice

Many types of work have peculiarities which make it necessary to vary the method of spraying to obtain satisfactory results. This is particularly true when the base material is other than metal. While it is not possible to outline a correct procedure for every job, the following general considerations will prove helpful. A good operator will soon "get the feel" of the gun and almost instinctively know and follow the right procedure after a little experience.

The structure of sprayed metal is quite different from that found in cast, rolled or drawn metals. As the small molten particles are sprayed from the gun they strike the surface, where they flatten out, and cool almost instantly. Thus a stratified metal structure of small, flattened, interlocking metal particles is built up, which is partly previous due to the presence of slight amounts of oxide and absorbed gases.

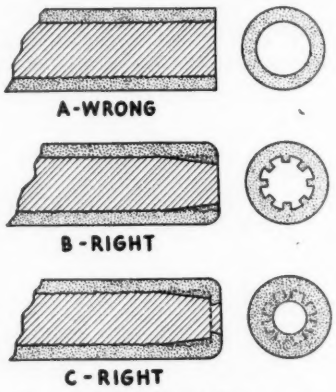


Fig. 9. When dovetailing is impossible use the slotting method shown in B or undercut, and dove-tail the end of the shaft (with or without slotting) as shown in C. A round corner should be put on the sprayed metal when finishing

This unique structure results in a change of physical characteristics of the metal. The ductility, elongation and tensile strength of sprayed metal are greatly reduced, when compared with the same metal in the cast form. On the other hand, the qualities of compression, wear resistance, corrosion resistance, hardness, heat and electrical conductivity remain virtually unchanged, so far as the practical uses of the process are concerned.

The metallizing process should not be used where the sprayed metal will be subjected to sharp impact, continued pounding at one point, or severe edge strain. However, the process is entirely satisfactory for use on bearing surfaces, such as crankshaft bearings, where there is a considerable vibration, but where there is full bearing surface contact rather than point contact, such as would be encountered in a ball bearing race.

Because of its unique characteristics, sprayed metal is extremely satisfactory on journals and other wearing surfaces of all kinds. Repeated tests

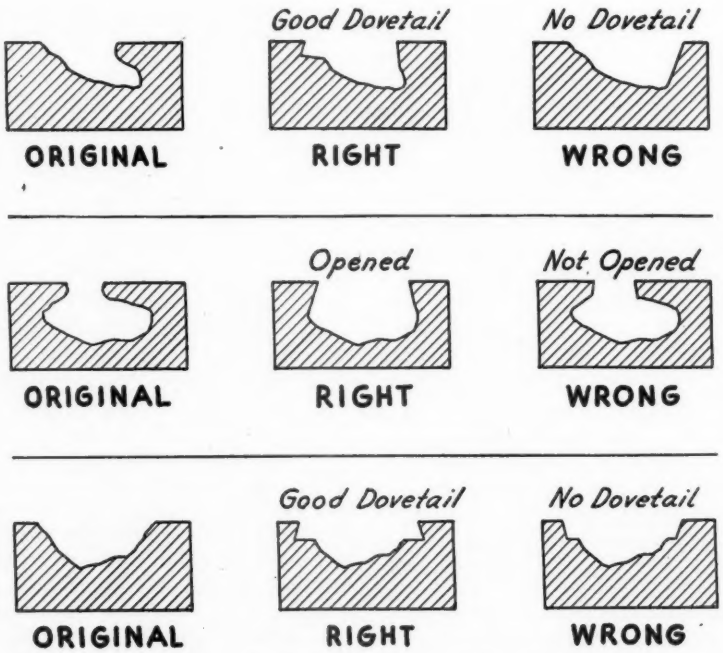


Fig. 10. The proper method of preparing blow holes and other defects for metallizing

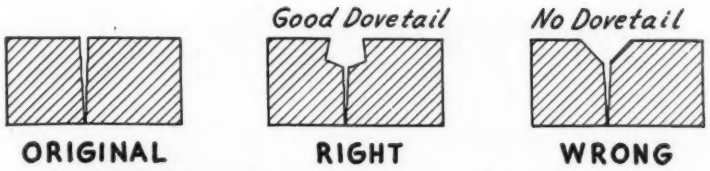


Fig. 11. The proper method for preparing cracks for metallizing

both in the laboratory and the field show that sprayed journals give from two to five times the life of journals not sprayed.

The time that elapses between preparation and spraying should be held to a minimum, although this is not such an important consideration when the base material is non-metallic. When the base material is metal it should be sprayed before oxides or other forms of corrosion form on the surface, since these will prevent good bonding between the sprayed metal and the base metal. If the base material is iron or steel, extra care must be used because these metals will oxidize readily in damp atmospheres. No hard and fast rules can be laid down, but in very damp atmospheres iron or steel should be sprayed within two or three hours after preparation. If the atmosphere is very dry, even 24 hours delay in spraying will not materially affect the bond.

When spraying outside diameters such as shafts, the slight heat generated by the spraying operation helps considerably to strengthen the bond between the base material and the sprayed metal. As each successive layer is applied, it cools and contracts. Consequently, the sprayed metal coating is tightened on the shaft in a manner similar to the shrinking on of a sleeve. By the same token, when coatings are applied to inside diameters, the same action takes place. In this case, however, the shrinking of the sprayed metal weakens the bond. Therefore, much greater care must be exercised in preparing and spraying inside diameters.

When coatings are applied to a flat surface, a tensile stress is set up in the coating as it cools. This results in a compressive stress at the surface of the base material. If the base material has a thin section, it may be deformed. If the base material has a heavy section, and thus is able to resist deformation, the stresses set up by cooling will tend to lift the coating at the edges. For these reasons it is essential that the proper preparation of flat surfaces always be given careful consideration.

It should also be remembered that these stresses due to cooling will increase as the thickness of the coating increases. Consequently, there is a practical limit to the thickness which can be applied to inside diameters and flat surfaces unless the bond is to be seriously weakened. The effect of these stresses is also influenced by the ductility of the metal being sprayed. Very heavy coatings of softer metals, such as lead and tin, can be applied without any bonding difficulties, whereas the same thickness of coating using the copper alloys or steels would cause difficulty.

In order to minimize the effect of cooling stresses, it is important that all inside diameters and flat surfaces be kept as cool as possible during the spraying operation. This can be done by applying only a few thousandths (.002 in. to .004 in.) per coat, and by allowing each coating to cool before applying the successive coat. Various methods of cooling can be used, such as an air blast on the outside of a cylinder. A good practical indication that the piece is cool enough for the succeeding coat is when the back of the hand can be placed on it without discomfort.

Cracking—Although the heat from the spraying operation strengthens the bond on outside diameters, it also sometimes results in longitudinal cracks in the coating. These will usually be found at the ends of the coating. Some metals are worse offenders than others in this respect, and more care should be taken to avoid overheating when spraying steels having a high carbon content, and also the stainless steels. Therefore, it is advisable not to overheat a shaft when spraying.

Spraying Shafts—It is entirely possible, and sometimes desirable, to apply a very heavy coating with one pass of the gun. Coatings as heavy as 1 in. on the diameter have been so applied. However, the method of applying light coats, with many passes, will generally be more satisfactory. If a heavy coating is required with one pass, the surface speed and carriage feed should be set so as to enable the entire thickness to be applied at once. A second coating should not be applied over a heavy coating which has been put on with one pass of the gun.

Spraying Inside Diameters—When spraying inside diameters, the same general rules apply as given for shafts. The only exception is that the coating should never be applied with one pass of the gun. The r.p.m. should be set to give a surface speed of about 75 surface feet per minute, and the traverse 1/6 in. per revolution.

Since practically all flat surfaces are sprayed by hand, some skill is required of the operator if an even coating is to be obtained. For instance, if the operator should pass the gun across the surface with the same speed for all metals that are used, he will be applying light coatings of the metals which spray slowly, and heavier coating of the faster spraying metals. Experience will automatically speed up his movements with the faster metals, and slow them down when spraying the slower ones. Unless great care is taken, there will always be a tendency to apply too heavy coatings of the faster spraying metals.

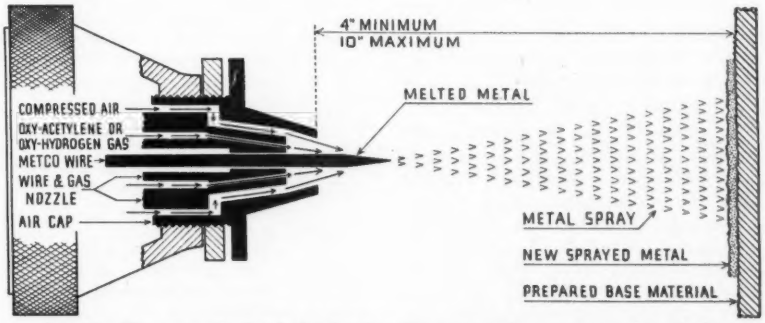


Fig. 12. Diagrammatic sketch showing how the gases and oxygen pass through the gun and produce a metal spray

Inventory Your Manpower Now!

By LEWIS B. HERSHEY
Major General, U.S.A.
Director of Selective Service

MANPOWER is a most important strategic material of today. Every employer should make a prompt inventory, appraisal and analysis of the manpower in his own plant as he would inventory his stock pile. In order to keep production going and at the same time furnish men for the armed forces, industry should now establish an orderly replacement program.

In order to secure temporary deferments for essential men while he is training women, young men, older men, men physically handicapped or those with a high degree of dependency, the employer should know the fundamental principles in the operation of his local Selective Service Board. Certain steps should now be taken by each employer. He should know how many men on his pay roll are between the ages of 20 and 45. He should investigate the classification of every one of those men. On the basis of such an inventory he should prepare to plan ahead and train men for replacement of those who must necessarily enter the armed forces if we are to have the sort of army which can win the war.

Deferments Temporary

Deferments, granted so that employers may train women or men not liable to early induction, are temporary deferments; they cannot exceed six months and in many cases may be for only 30, 60 or 90 days. The Army today has to train a bomber pilot within a period of eight months to operate a very technical machine with an instrument board which puzzles an expert. Why, therefore, should industry insist that it assume that it can take two or three years to train men for industrial tasks not nearly so complicated?

The fundamental purpose of every deferment of a registrant is to allow an employer to train a replacement. Only in a few rare instances can an employer expect to have these temporary deferments continued for more than the six months period. These are only in cases where an abnormally long period of training is required for a replacement and the eight months needed in which a bomber pilot can be turned out now, is something to remember in this connection.

Employer's Responsibility

Employers may seek the deferment of their necessary men with or without their consent. Here is how they go about it.

On page 3 of the Selective Service Questionnaire (Form 40) which is sent to each registrant before he is classified is the following:

Instructions.—If your employer believes that you are a necessary man in a necessary occupation, it is his duty to fill out Form 42A requesting your deferment. You may also attach to this page any further statement by yourself which you think the local board should consider in determining your classification. Such statement will then become a part of the questionnaire.

This is on all the questionnaires distributed during the past six months. The fact that the Selective Service System now specifically mentions the filing of Form 42A as the manufacturers' duty is a clear indication of the Selective Service System view on the responsibility of each employer in this matter.

The employer can secure Form 42A at the local board and the local board will consider the employer's request when the form is properly filled out and signed.

If such request should be denied because the man, after consideration of the claims offered for him, is not considered to be indispensable to the company's operation, and is needed more in the armed services, the local board will advise the employer of its refusal of such an occupational deferment.

The local board does this by sending to the employer, at the same time it notifies the registrant of his classification, a Form 59.

May Make Appeal

There are 10 days after Form 59 is mailed by the local board to the employer during which the employer can appeal the registrant's case. The registrant will not be ordered to report for induction during this 10-day

(*Continued on page 56*)

DEFERMENT OF NONFERROUS METAL MINERS

The National Headquarters of the Selective Service System recently issued Local Board Release No. 150, Effective: August 29, 1942, on the subject of Classification of Workers Engaged in the Production, Milling, and Refining of Nonferrous Metals.

1. Occupational Bulletins.—Occupational Bulletin No. 12 includes the nonferrous metal-mining activity as essential to the support of the war effort. Occupational Bulletin No. 16 includes the smelting, refining, and rolling of metals as an activity essential to war production.

2. Shortage in certain activities.—There exists a critical shortage of workers for the production and refining of copper, lead, zinc, manganese, and other essential nonferrous metals, and there is a serious loss of effectiveness in the manufacture of war implements and equipment resulting from this condition.

3. Consideration of occupational classification.—Local boards are therefore directed to seriously consider the deferment of workers in this activity.

4. Communications with persons in the activity.—Messages have been sent to the workers in this activity by the War Manpower Commission, the War Labor Board, the War Production Board, and the Selective Service System describing the essential nature of the activity and the existence of a critical shortage of manpower.

5. Certain conditions for occupational classification.—While considering classifications in the light of protecting the effectiveness of this activity from impairment by loss of manpower, local boards are directed that only those who devote the prescribed working week, each week, and the prescribed working day, each day, and those who remain employed in the essential activity for which they have been deferred are qualified for consideration.

LEWIS B. HERSHEY,
Director.

METAL MINING'S MANPOWER PROBLEM

● ***Producers of copper, lead, zinc and other critical and strategic minerals are experiencing a realistic demonstration of the law of supply and demand in the exodus of mine labor to war plants and government construction projects. Mining companies burdened with frozen metal prices cannot compete with contractors operating under cost-plus-a-fee contracts. The obvious result is a serious bottleneck looming ahead in the critical fourth quarter of this year in the production of metals. Operators express their views on this difficult situation as it affects various metal and nonmetallic mining districts. Government action expected soon***

ARIZONA

COPPER

H. M. LAVENDER, General Manager
Phelps Dodge Corporation

IN MOST of our camps we are acutely short of common labor. This is the classification which involves general roustabout and clean-up duties and is one which does not involve apprentice or special training leading to a skilled or trained operator. The laborers who have performed these duties in the past have been for the most part Mexicans and right at the present time an acute shortage exists in this classification.

Another classification in which there is an acute shortage is that of mechanics including the various occupations under this general heading. This prevails throughout the industry so our position is no different than that of others.

* * *

T. H. O'BRIEN, Vice Pres. and Gen. Mgr., *Inspiration Consolidated Copper Company*

THE GLOBE-MIAMI district has been more or less hampered by labor shortage during the past year, and especially during the last few months, when many men have left to take better paid jobs on Government construction projects. Since there has been no large local reserve of unemployed labor, many of the men who were previously working in the mines have transferred to these Government projects. The mines, even though the present wage scales are the highest in the history of the district, cannot, with a 12c ceiling price for copper, match the wages paid by the Government or by Government contractors.

At the present time, the mines of this district are short about 500 men. This would not appear to be a large number but actually it represents approximately 13 percent of the local mining payrolls. In this connection, the question of quality, rather than quantity, enters into the problem. The mining companies are up against a constantly increasing labor turnover. The more experienced miners are leaving the mines and are being replaced, if and when the men are available, by inexperienced men. The consequent loss in efficiency has a direct bearing on production.

The local draft board appreciates the necessity of keeping men at work in the mines, and has granted deferments of all key men as requested, but many miners coming from other counties or states cannot secure a like consideration from their own local boards.

Local U. S. Employment Service officials have done what they can to keep up the mining labor supply, but there has also been great pressure on them to supply men for the new Government construction, a large part of which is considered most urgent.

It would seem that each one of the new projects should be reviewed by the Federal Manpower Commission in Washington before a contract is actually let, and that in each case the local labor situation should be given careful consideration. In many cases this might result in postponing the proposed work, or in limiting the number of men who were to be employed, when the employment of additional men would involve a shortage in the mining camps and thus delay the production of vitally important war metals.

* * *

R. W. HUGHES, General Supt.
Miami Copper Company

AT THE Miami Copper Company, monthly turnover which in 1939 ran 2½ percent, rose to 3 percent in 1940; 5½ percent in 1941 and for the first six months of 1942, ran 9 percent.

Entrances for the first six months of 1942 have been but 93 percent of terminations. Entrances are inexperienced, a large portion with no previous mining experience and 10½ percent of them leave in less than two weeks, while 54 percent leave in less than six months. Job dilution has affected the efficiency of long service employes.

Production has been maintained at the sacrifice of development work. For the first seven months of 1942, monthly production has averaged above 480,000 tons, while preparation of new ore for production has progressed at a rate above 300,000 tons. Curtailment of production is anticipated within six months.

Absenteeism, while a factor in our manpower shortage, is not serious. For all causes, including sickness, accident and leaves granted, it is running 7 percent of the total shifts worked. Individual workers have bad records, but on a whole men are steady.

Suggested remedies are: Draft quotas are set on total population with no regard for essential industries within the board's jurisdiction. Gila County, Arizona, has the Nevada Consolidated Copper Company, Inspiration Consolidated Copper Company and the Miami

Copper Company, all producing, and the Castle Dome Company under development. In spite of this the county board is required to furnish its draft quota.

While "freezing" is not desirable, regulations requiring workers to show good cause before leaving, should be instituted.

Payment of unemployment insurance for men leaving of their own volition should be curtailed.

CALIFORNIA

QUICKSILVER

WORTHEN BRADLEY, President
Bradley Mining Co.

MOST of our quicksilver mines are badly undermanned, and for that reason necessary development work is being neglected. This cannot be classed as spot news, nor is it peculiar to our industry; but at least it was emphatically confirmed by the group of quicksilver operators who assembled in San Francisco on August 17. The meeting was held in the local War Production Board offices and was under the leadership of R. J. Lund, chief of the Miscellaneous Minerals Branch. The operators present represented over 80 percent of our national quicksilver production, and there evolved a three-cornered agreement of cooperation between these operators, the War Production Board and the U. S. Employment Service. Specific statements of shortages of men for various jobs were made by the operators, and noted by the government officials. Miners and muckers lead the list.

Quicksilver production is still good, and a majority of the operators could not report any actual lessening of output due to labor difficulties. But they were practically unanimous on the subject of neglect of development, and a few reported that this lack of preparatory mining will mean furnace shut-downs as early as October. Those who foresaw early shutdowns did not expect to be forced out of the quicksilver business, but planned to turn what crews they had to development until such time as production could be resumed.

All agreed that the quality of labor has noticeably diminished, when measured by tons per man shift (halved in some instances) or by other standards. There was some difference of opinion on the main reason for their inability to keep a full crew: Whether it was chiefly low pay as compared to shipbuilding and other "cost-plus" industries; loss of men by the draft, or by enlistment in anticipation of the draft; the fear of being "marooned" in the hills, without automobile tires; the continual search for more congenial employment and surroundings (many workers "shop around" in their own industry, traveling from quicksilver mine to quicksilver mine); or just the general restlessness in the air. Undoubtedly it is a combination of all of these factors, and perhaps others not mentioned.

All the operators have made pay raises and will probably make more (but there will obviously be a limit to this); all are endeavoring to bring their camp facilities and working conditions to a point equal to or better than what is expected by Mr. Average Worker of 1942. Operators are training replacements (when they can get them) for their key jobs; some are offering miscellaneous financial inducements such as production bonuses, low cost group insurance, and pay raises for length of service; and most are providing free transportation for new men coming to camp, and for those already on the job who have to commute.

There is no easy solution to this labor shortage. All the operators can do is continue their pressure, in various ways, to hire new men and to hold the men they've got; and to hope that more help in this direction may be coming from the War Production Board, U. S. Employment Service, Selective Service, and other governmental agencies concerned.

COLORADO

VANADIUM

BLAIR BURWELL, General Supt.
United States Vanadium Corp.

IN THE vanadium field in Colorado, labor turnover in the first six months of 1942 is approximately double that of the previous six months. Figures of the last month are not complete, but indicate that the rate of turnover is much accelerated over the six months' average. A small surplus of labor has existed up to the first of this year, but this has vanished and in one operation a drop in tonnage of 50 percent due to labor shortage was encountered. The local draft boards have been most cooperative, and most of the shortage of labor is due to the leaving of men for highly advertised, temporarily highly paid Government construction jobs. Soliciting of skilled miners for foreign construction work, at high rates of pay, has created a labor shortage in the Bishop tungsten area, and will result in a reduction of tonnage in the next few months, when surface mining of tungsten ore is completed for the season.

There is much restlessness among old employes due to the uncertainty of governmental policy in freezing labor, and the desire to be in the best paid job when that is done.

* * *

FREDERICK F. KETT, Gen. Mgr.
Mining Division
Vanadium Corporation of America

NORMAL OPERATIONS at our Conger tungsten mine at Nederland, have been at the rate of about 40 tons of ore per day. Labor is very scarce in this district and we have had to close down two of the three operating mines, as we only had one machine man working.

At Naturita, the capacity of our vanadium operation is about 80 tons crude ore per day. There is a shortage of experienced miners in this area, although generally speaking we have managed to hire sufficient inexperienced help to keep going. Actually the number of men on the payroll is normal, but their inexperience makes operations less efficient.

TUNGSTEN

WILLIAM LOACH, President
The Wolf Tongue Mining Company

THE labor situation in Boulder County with respect to experienced miners is very acute. We are mining tungsten ore which is vitally needed in the war effort and it is very important that every possible pound be produced during this emergency.

On account of the extremely high wages being paid on Government projects and in some of the defense plants, our men are leaving us to work in other places where the wages are so high that they are prohibitive in our line.

The schools in Boulder are running 24-hour classes in teaching men for various jobs in defense plants. Many of our men went to night school and as soon as they knew something about the operation of the various machines they were immediately employed in defense plants.

We have taken on a number of men and taught them mining only to have them leave within a few weeks for higher wages elsewhere. We have lost some men to the draft. However, the local draft board has been very considerate

and fair so far as men working in the tungsten industry are concerned and we have no complaint in this respect.

This company does not undertake to criticize men for obtaining the best returns from their labor that are obtainable. It is fair to say, however, that we would add a large number of men to the pay roll of this company if we could get them at the wage scale that we can pay and at this time, our wage scale is the highest ever paid in this region.

GOLD-SILVER-LEAD

H. L. TEDROW, General Supt.
The London Mines and Milling Co.

THERE is little difference between the labor situation in Alma mining area and that generally prevailing in other mining districts. It has been apparent for some time that a shortage of metals due to the shortage of manpower can be expected, instead of the increased production as required in our war effort.

This company felt the pinch over a year ago and has consistently lost men in spite of a wage increase as large as it could afford. I don't think the men can be blamed for leaving for the higher wages paid in other work, but the ordinary mine simply cannot compete. Instead of a normal crew of about 250 men, we now have about 50, and mining operations are out of the question. We have managed to carry on some development work underground and to maintain a fair production by milling a large dump which we had available. In this way we have been able to give employment to such men as wanted to stay with us.

Even with our reduced operations we have difficulty in securing sufficient men, and with women going into war production work, the thought occurred that possibly women could be used in our plant. Accordingly, a survey was made to see what jobs, if any, could be handled by women. As a result we have started four women in our sorting plant, picking waste out of the ore as it passes by them on a belt conveyor. These women are working hard and have proven entirely satisfactory. They have quickly learned to distinguish waste from ore, and are learning to start and stop the machinery and are doing a good job of keeping the place and equipment clean. In this way we have been able to shift the men formerly used as ore sorters to other work. By arranging the duties so as to eliminate the heavier work, we expect to find more jobs in our plant which can be handled by women.

GOLD-LEAD-ZINC

CHARLES N. BELL
The King Lease, Inc.

THE LABOR shortage at our property during the summer has been around 13 percent. Part of our crew has consisted of high school boys who have now returned to school, and our current shortage is now around 22 percent. Our labor turnover is 13.4 percent.

Broken ore reserves have been reduced 47 percent in 7½ months but a large part of this was due to efforts of a labor organization to organize the employes. In general, the labor shortages in Colorado may be said to increase directly as the distances from defense plants decrease. The metal mining industry cannot compete with war construction work on a cost-plus basis or with any Government project.

Evidence that women are serving the mining industry in its war effort comes from Colorado. Here are four women sorting ore vitally needed at the mine of the London Mining and Milling Co., Alma, Colo. By the end of the year many more women in mining camps may have an opportunity to demonstrate their skill

IDAHO

LEAD-ZINC

DONALD A. CALLAHAN, President
Callahan Consolidated Mines, Inc.

THERE is a shortage of manpower in the Coeur d'Alene mines but up to date this has not interfered with production and development as compared with a year ago. This is due to the fact that the men are working six days a week instead of five.

There is no question, however, but that the Selective Service has drawn many of the best men from the mines. It is especially desirable that some change be made since the production of lead and zinc is as important as any war production effort in the nation.

There is also no question but that a number of the men, especially experienced miners, have been drawn away because of the fantastic wages which are being paid in nearby war plant construction projects. There are several large war construction jobs where the wages offered men are far beyond the ability of the mines to compete with.

It has been urged that an increase in wages will have the result of keeping the men in the mines. This is a fallacious position for the simple reason that the mines under any circumstances cannot hope to compete with Government contractors under the cost-plus-fixed-fee system. The mining companies simply do not have the resources, even if the price of metals were raised, to compete with a Government which has an unlimited purse with which to build these plants.

Then again, the effect of such a policy would be definitely inflationary. If the mining companies raised wages, it would necessitate a raise in the price of metals. If by this means they were able to retain their men, contractors upon Government jobs would unquestionably raise theirs again in an

effort to secure the labor. This would result in an inflationary spiral which would be very disastrous.

The solution is a stiff policy upon the part of the Government which will insure sufficient labor to produce these highly essential metals. There can be no other answer which does not involve a competitive situation which will be highly inflationary and in the end will not accomplish the result desired.

* * *

C. A. DYE, General Manager
Silver Bell Mine

HEREWITH are some comments on the labor situation which I have collected during the last two or three months in western Montana, Idaho and eastern Washington, while doing some examination work.

Generally speaking, the small and remote operation feels little or no shortage of labor as he depends on local labor that will not or cannot leave the community. Large operations in the area mentioned are seriously short of labor, output is much less than normal because men cannot be had and green men taken on in a desperate effort to hold up production are not efficient. Ton-output per man is very low and cost per ton very high.

A small operator. "Draft labor. Tell them where and for whom they may work. Set their wages. We draft men for the armed forces, set their wages, work them hard and they can't strike. They can only go out and get killed trying to protect the rest of us. Why is the man at home in a soft job at high wages any better?"

Research engineer. "There is no labor problem—only a Washington problem. Too many little men head up Washington agencies. Trying to justify the existence of their useless positions. Washington thinks the war is only a show. Every time a man kills two Japs he is brought back and paraded all over the country like a Hollywood screen star. Is it a war or a circus?"

Mine contractor. "Put some labor leaders in the army and move up some good men from the ranks of labor."

Mine operator. "Why does Washington permit cost-plus contracts with no ceiling on wages right next door to a large mining district where $6.00 to $8.00 per shift is considered high wages? Boys 18 and 20 years old are making $80 to $100 per week on cost-plus contract work. Why should men work for mines when they can make such money only a few miles away? Maybe the professors, economists and social theorists planned it that way."

Mine investor. "Nothing can be done now that will bring back the men who have left the mines for better paying jobs. Why were miners permitted to enlist in the first place? Didn't we know that England had to call back thousands of her coal miners from the army? I'd raise the price of wages to hold the men in the mines and raise the price of metals to meet the extra cost."

Machinery manufacturer. "Put in more machinery and use fewer men."

Hotel clerk. "Why should you worry! Washington from the top down is going to put through a social reform and no Jap or Nazi is going to stop them. Labor is only a tool being used for the job."

* * *

L. E. HANLEY, President
Hecla Mining Company

THE labor shortage in the Coeur d'Alene district is approximately 750 men or 20 percent of normal. Half of the shortage is in unskilled labor. The loss of ore each month is about 35,000 tons. Fantastic earnings on nearby defense projects is the cause of this situation which has grown steadily worse during the past two months. Apparently the only remedy is for Government agencies to limit wages on defense projects particularly unskilled labor and prohibit hiring from necessary industries. I do not favor inflationary increase in price of metals and raise in mine wages because competing contractors could make corresponding increases at taxpayers' expense and no benefits would be gained by metal mine operators in producing more ore for the war effort. The situation is becoming critical and demands prompt action.

TUNGSTEN

A. H. BURROUGHS, JR., President
Talache Mines, Inc.

MANY mines in Idaho are operating far below capacity due to shortage of labor. In the Coeur d'Alene lead-zinc district the mines generally have lost 20 percent of their manpower and the silver mines 30 percent. In the Wood River lead-zinc district and other parts of southern Idaho the loss of manpower is generally from 40 to 50 percent with few exceptions.

A typical example in another district in southern Idaho is a mine normally producing 400 tons per day with a crew of 225 men now has a crew of 125 and production has fallen to 250 tons per day. Absenteeism accounts for about 5 percent of the lost production. Labor turnover is from 25 to 35 percent per month.

The draft is not directly taking a large percentage of mine employes, but has caused large numbers to seek employment in war work, particularly on the coast. The loss has been greater in unskilled labor, such as shovelers or muckers, than miners or other more skilled labor.

It is believed loss of manpower can be largely corrected by applying the following remedies:

1. Lower wages on Federal sponsored projects, particularly for unskilled labor.
2. Liberal application by local draft boards in extending deferment under regulations set forth in Occupational Bulletin No. 12.
3. Wide publicity regarding importance of mineral production to war aims.
4. Distribution of authentic information regarding real wages received in war industries by comparison with home industries, all factors being considered.
5. Taking the proper steps to prevent the pirating of labor from one locality or industry to another.

The specific example cited of a mine in southern Idaho other than in the Wood River district is that of Talache Mines, which is largely a gold-silver producer. However, we have developed one tungsten ore body and half of our mill capacity was converted over for treatment of this ore.

Production started in a small way in April and has gradually been increased with production in July equalling the combined production for May and June. August production is running ahead of July production and in preparing stopes for larger scale production we have recently encountered some rather high grade tungsten.

Notwithstanding these conditions and the fact that same are recognized by the War Production Board and the local draft board, a good many of our men are leaving to accept employment in other mines or industries where they feel they will be contributing more to the war effort, and we find it very difficult to counteract this feeling without having local support and publicity.

NEW MEXICO

POTASH

R. M. MAGRAW, General Manager
Potash Company of America

THE LABOR turnover at our plant has from an almost static condition prior to passage of the Selective Service and Training Act, become a very disturbing factor. We lost from all causes 184 men during 1940, 194 in 1941,

and during the first seven months of this year 234 men.

We have not as yet suffered any material loss of output directly attributable to labor turnover, but no doubt there has been some loss due to the employment of green men. Each succeeding group is inferior to the one replaced, older, physically inferior, and usually absolutely untrained and inexperienced in industrial work.

We have had very little competition from neighboring industries, this being attributed to superior working and living conditions and to a very much higher wage scale.

Defections are due to men entering defense work, primarily to avoid the draft; work on construction of Government projects on account of high base rates and overtime; and to voluntary enlistment and induction into the armed forces of the nation. Potash Company of America with a normal staff of several hundred employes has lost from the last mentioned cause 102 men to date. We have experienced no trouble due to absenteeism.

Regarding "possible remedies and means of overcoming these losses," I may say that this is a problem involving serious divergence of opinion even in high places. I do not feel qualified to give a definite answer but the following thoughts are submitted for what they may be worth: first, grant deferment to any man in an essential position whose training takes longer than six months; second, let it be known that men leaving an essential industry (potash has been so designated), to enter defense work, or to take civilian jobs with the Government in order to escape the draft, shall be immediately inducted into the service.

COPPER

HORACE MOSES, General Manager, Chino Mines

Nevada Consolidated Copper Corp.

AS YET we have experienced no tonnage loss. However, skilled labor is leaving almost daily and no doubt within the very near future this may develop into a serious shortage. Approximately 275 men have left this organization to join armed forces and a substantial number of skilled workmen have left to accept positions with contractors who are engaged in other defense industries.

ZINC-LEAD

IRA L. WRIGHT, General Manager

Black Hawk Consolidated Mines Co.

UP TO THE present time there has not been reported any marked reduction in output per man but the situation will undoubtedly become more acute as additional men are called to the draft. One or two of the mining companies have asked for deferment in some cases but most of the operators have refrained from making such requests up to this time. However, it may become imperative that certain key men be retained in their present work if production is to be maintained.

One of our mine operators employing more than 300 men reports that monthly labor turnover is approximately 13 percent. This experience, however, is not reported by other companies in the district. Most of the companies report that their most serious loss of manpower is from the draft but there are several contributing factors. The shortage of labor may be attributed to the following causes in the order of their importance:

1. Marked increase in production necessitating an additional supply of labor over that formerly required.
2. Draftees for the armed service.
3. High wages paid by contractors on 10 percent plus jobs.
4. High wages paid by the mines increase absenteeism particularly the morning after pay day.

Few of the operators in this district with whom I have talked think much of the proposal to freeze labor. It is not believed that a man who is not free to seek the work which appears to him to be the most suitable will be an efficient worker. It is believed that the best method of preventing the pirating of labor is to equalize wages in various industries. Equalization of wages would take into consideration cost of living, working conditions and any other factor that enters into the real income and well being of the worker.

NEVADA

COPPER

C. I. COOK, General Manager

Consolidated Coppermines Corporation

THE SHORTAGE of mine labor in the Ely district has resulted in serious loss of copper production from the underground mines. The largest underground mine in the district has lost over 20 percent of its experienced miners and ore handling crews and replacements cannot be obtained. Many men have been drafted but the greatest and most serious loss has resulted from the migration of miners to shipyards and war factories where much higher wages are paid. Under a 12-cent ceiling price for copper, and little relief from bonus premiums under the quota plan because of drop in production resulting from labor shortage, it is impossible to raise wages at the mines sufficiently to compete with war factories and cost-plus construction jobs. The only solution to the problem of maintaining maximum production from the copper mines is to increase the price of copper sufficiently to enable the copper producers to increase wage rates to a scale that will compare favorably with the wage scales paid by the producers of the finished war equipment.

ZINC-LEAD

E. H. SNYDER, Gen. Mgr.

Combined Metals Reduction Co.

DURING July, 1941, mill construction at our Pioche operations was under way employing 149 men. In order to make a true comparison we have deducted 149 men from the total of 400 from our employment report and added 15 men representing the mill operating crew had the mill been running then, thus arriving at a total of 266 men as being comparable with July, 1942.

From this total of 266 men, our force has dropped to 141 men, a loss of 125 men or 47 percent.

At our three properties (two in Utah, one in Nevada) we are now shorthanded 253 men.

Another feature of importance is that now we have many employes who are either too old to perform their duties efficiently or are lacking in experience. This is particularly true as regards machine miners, many of whom are working "over their heads."

OREGON

QUICKSILVER

S. H. WILLISTON, Vice President and Treasurer

Horse Heaven Mines, Inc.

THE LABOR shortages in quicksilver mines in Oregon are serious, not only in number but in skilled men. At Cordero Mining Company the current shortage is 45 percent and all of our skilled miners are gone. At Horse Heaven the shortage is approximately 25 percent. At Bonanza, Sutherlin, Oregon, the shortage is approximately 25 percent. At certain of the smaller mines in the Ochocos

the shortage ranges up to 80 percent. Most of the men remaining are new employes with little if any mining experience. Development work has almost entirely stopped at every operating property of which I have knowledge in the state of Oregon.

Most of the men are leaving the mines for cantonment construction work or for shipyard work, the Army and the Navy. Offers of $1.33 per hour to $1.48 per hour for miners, powdermen and underground foremen offered by contractors with overtime pay up to 30 hours a week are impossible to compete with. As a result, most of the remaining men at the mines are restless. Most of the mines have increased wage rates from 20 percent to 30 percent since January 1, 1941. With fixed prices for metals and with inexperienced labor it is manifestly impossible to increase labor rates another 50 percent or more to return the men to the mining industry.

UTAH

LEAD-ZINC

W. J. O'CONNOR, Manager,
Utah Department
American Smelting and Refining Company

IN 1941, industry in Utah employed an average of over 90,000 workers, of whom about 12,000 were employed in the nonferrous mining and smelting industry. The average wage for all industry was $115.60 per month, whereas the average monthly wage in the mining and smelting group was $152.50.

Right now the various mines and smelters of this district are very short of labor, and as a result, the production of necessary minerals is adversely affected. The competition that is depriving Utah mines of necessary labor is that of the cost-plus war projects, that pay from $1.50 to $2 a day above the wages paid in the mines. This creates a situation that private industry cannot possibly hope to meet.

Figures indicate that war industries in Utah have taken some 23,000 workers, and estimates have been made that these industries will probably require 25,000 additional by the end of the year. The employment of these people from our limited labor supply, at fabulous wages, is the paramount cause of our labor shortage.

We find that we have lost comparatively very few men on account of the draft; the chief cause of men leaving is to work for the higher paid war industries.

JAMES IVERS, General Manager
Silver King Coalition Mines Co.

SHORTAGE of labor in the metal mines, especially skilled labor, is becoming acute in this area. Information available indicates that most of the men who leave the mines do so to take employment in various defense plants here and elsewhere at wages which the mines are unable to pay. Replacements, in so far as they can be made at all, are chiefly by untrained or partially trained men, with resultant loss of efficiency and increased supervision cost. Some of the men return to the mines after short experience in their new employment but thus far only a few have returned and the movement is emphatically away from the mines.

This is having a noticeable effect on current production and is even more serious in its implications. Most mines in this area find it necessary to have a definite volume of ore production in order to remain in operation as well as to meet the urgent demands for large supplies of metals. The movement of labor away from the mines has required that remaining men be withdrawn from ore development and general maintenance work and employed instead on ore extraction in order to keep ore production at essential levels in the various properties. Ore development has therefore been heavily curtailed.

Obviously mine management unaided cannot correct or even materially improve the situation. The facts are well known here and have been communicated to various agencies believed to be so situated as to be able to contribute to a solution. It is apparent that if the movement continues ore production will continue to decline and in some cases must suspend entirely until sufficient development work has been done to permit resumption of productive operations.

* * *

JAMES W. WADE, President
Tintic Standard Mining Company

THE shortage of manpower in the Utah area has become acute and production is declining with little or no possibility of remedying the situation in sight.

The mines of Utah employ labor resident in the towns adjacent to the mining operations, which has been competent and ample, but with the advent of tremendous expansion of war activities within the state, a large part of available labor and much migratory labor has been put to work in these war industries.

The extent of employment offered by the war industries, so far as I know, is not of record, but the magnitude of the operations can leave no doubt that the employment offered is many times the amount of resident labor available.

* * *

E. H. SNYDER, Gen. Mgr.
Combined Metals Reduction Co.

DURING THE six months ending July 31, 1942, we have lost at our Bauer property a total of 78 men from our original force of 225, or a loss of 35 percent. During the month of July alone, we lost 46 men indicating that the trend is getting worse.

At our Bingham operations certain factors entered into a six-month comparison entirely aside from the labor question and we have, therefore, taken May, 1941, to July, 1942, or a loss of 49 percent.

VANADIUM

FREDERICK F. KETT, Gen. Mgr.
Mining Division
Vanadium Corporation of America

ON ALL of our western jobs the labor turnover is terrific, probably due to the attraction of the various war plants and government construction projects. However, since these plants are all at some distance from our operations, a good many of the men try the plants for a month or two and then return home. Possibly after the construction period is over at these war plants they will have less high paid work to offer and our situation may improve.

At Monticello, our vanadium operation is just starting, with capacity of 100 tons crude ore per day. We have been mining in this area for the last six months and while experienced miners are scarce we manage to get by. We think the labor situation in southeastern Utah may be somewhat better than in Colorado since labor here has not the same tendency to move around.

WASHINGTON

COPPER

JOHN J. CURZON, Manager
Chelan Division, Howe Sound Company

YOUR plan to determine the extent of the labor shortage in various mining districts seems to us to be an excellent one indeed. As the labor shortage is beginning to have a marked effect on our operation, we naturally have been giving considerable thought to this problem.

This property operates 13 out of 14 days with a most efficient milling rate around 2,000 tons per day. When the appeal was made in the latter part of 1941 by the Federal Government to increase production, plans were made to increase the average daily mill tonnage above 2,200 tons, which is an increase of approximately 10 percent. In order to maintain this tonnage and to do all the necessary development and exploration work to perpetuate the property, a crew of 270 men working underground every day is required.

The increase in tonnage did not materially affect the surface departments and no great difficulty has been found in maintaining crews for all departments except the mine, although the labor turnover has been considerable in all classifications. A serious shortage, however, has developed in the mine. The effective mine crew has dropped from the desired 270 men per day to an average of only 154 men per day for August 1 to 15, inclusive, which is 116 men down or 42.9 percent.

This drop has reached a point where practically all of the men are required to mine the ore previously blocked out and prepared for mining; while development and exploration work, which is so vital to the future of the property, has been reduced to an alarming extent. This condition can eventually result in only one of two things, either curtailed production or stoppage of production entirely while additional stoping areas are prepared for mining.

The reasons given by the 150 men leaving the mine during June and July were as follows:

	Number	Percent
No Reason	49	32.7
Supposed to have other job	40	26.7
Dissatisfied	19	12.6
Armed forces (enlistments and draft)	17	11.3
Miscellaneous	25	16.7
	150	100.0

In our case, the loss of the men called by Selective Service, plus those who have enlisted in the armed forces, has not been the major factor, although this loss has naturally included some of the better men. The serious situation is caused chiefly by the great percentage of men who quit for no apparent reason at all or say they are going to other jobs such as defense work in shipyards, plane factories or heavy construction where the higher pay is attractive. With metal prices pegged, mine operators cannot compete with the high pay of defense industries. Absenteeism is not a serious factor.

I believe that this situation can only be remedied by a firm labor policy emanating from Washington. If the supplies of metals are as short as estimated, experienced miners in non-essential mines should be placed in mines where sustained production of vital metals is imperative to national security. Drafting men from 18 to 21 would be advisable because men of this age make the best soldiers, while the older experienced men can accomplish more for the national effort in industry. Deferment of experienced underground men from military service is essential, but those deferred should realize their responsibility and not slow up on the job but should work harder.

Increased employment of women for work in which they are capable is desirable wherever feasible to free men for other jobs, although the men thus released are generally not suitable for underground work.

Somehow employes must be made to realize that the fight is not between the working man and the boss or owner but is the men, the boss and the owner working as a fighting team against the common enemy. Continued bickering will get us nowhere, and until both labor and capital realize that they are in this thing together and that their whole future depends upon the outcome of the war, only then can we, working as a team, backed by a strong labor policy established by Washington, hope to achieve victory.

ZINC

HOWARD I. YOUNG, President

American Zinc, Lead and Smelting Co.

THE NEARBY defense plants where wages much higher than we can afford are being paid, have taken a number of our men. We have also lost some through the Selective Service draft.

Thus far, production has not been substantially reduced because of labor shortage but with a continuation of our recent experience, production will be affected by the early part of the fourth quarter. At present, our crews are approximately 85 percent to 90 percent normal. Our per-ton man efficiency has been somewhat reduced because of the necessity of hiring new men who had had no previous mining experience.

ALASKA

GOLD-TUNGSTEN

P. R. BRADLEY, President

Alaska Juneau Gold Mining Co.

OUR Juneau operations are now less than 50 percent capacity and our crew has been reduced from an average of 950 men to about 390 men. The close proximity of Government work, which pays a much higher wage scale than we can afford to pay, is, I would say, about 80 percent responsible for our reduced crew; 10 percent might be accounted for by the draft; 5 percent by the usual seasonal changes of occupation, and the remaining 5 percent due to miscellaneous causes.

The loss of our men into contract work on defense measures has been in direct proportion to the distance of those measures from our mine.

Through the summer months there are always a number of mine employes who seek other occupations, the change of location having the effect of a vacation. Ordinarily such men return to underground work when winter approaches, but I cannot make any predictions as to what will happen to these men this year.

MICHIGAN

COPPER

E. R. LOVELL, General Manager

Calumet and Hecla Consolidated Copper Co.

THE labor shortage, especially of underground workers, is becoming more and more serious. A thorough canvass of the situation reveals the fact that there are no employable experienced underground workers available. Even inexperienced labor is difficult to obtain, in spite of lowered physical standards and completely ignoring draft classifications. The local branch office of the United States Employment Service substantiates this statement.

The following table gives some idea of the increase of force and labor turnover we have had in the past seven months of this year:

	Hired
Underground	229
Surface	192
Total	421

Armed Forces	Left District	Lay-offs Discharges	Total
21	35	9	65
28	16	19	63
49	51	28	128

Labor turnover due to the needs of the armed forces is at least 95 percent greater than in the corresponding period last year; competition from other industries is about 50 percent greater. There is no change in labor loss due to absenteeism. Because of completely changed conditions, it is impossible to estimate the loss of tonnage.

The best remedy appears to be a blanket deferment for all underground workers, regardless of draft

classification. Freezing of labor in essential war industries should help.

Nothing should be done to upset the wage scale now in force at the copper mines.

* * *

WILLIAM H. SCHACHT, President
Copper Range Co.

THERE is a very definite shortage of experienced underground miners and experienced mine equipment operators in the copper mines of Michigan resulting in a decrease in production of approximately 10 percent. Applications for underground employment which for the most part are being received from inexperienced men are becoming fewer. The draft boards are very cooperative in deferring men. However, many good men have volunteered and others have refused to request deferment. Approximately 5 percent in number of our employes are in the armed forces. The greater portion of the men who are leaving the employ of the copper mines in this district are obtaining employment in the industrial centers in the Detroit and Chicago areas where a very much higher wage scale prevails. Although not serious, there is a tendency for men to be absent from work more frequently than in the past. With the shortage of experienced workers it is impossible to enforce too much discipline in connection with absenteeism and requests for vacations, even though such requests are in a number of cases time off to search for another job.

* * *

R. S. ARCHIBALD
North Range Mining Co.

THE recent recommendations the Manpower Commission to local draft boards for exemption of essential occupations in the mining industry will materially help our labor situation. Our principal difficulty hereafter will be our employes leaving jobs to seek higher wages in defense plants. It would be desirable in our opinion to freeze employes in essential industries in their present jobs for the duration.

MISSISSIPPI VALLEY

ZINC-FLUORSPAR

W. N. SMITH, General Manager
Mahoning Mining Company

THE operations of the Mahoning Mining Company in the Illinois-Kentucky fluorspar district, and of the Vinegar Hill Zinc Company in the Wisconsin District, have not been seriously affected as yet by labor shortage. It is a fact that the labor situation is tight in the mines. In the concentrating plants, however, we have not been particularly affected. The local draft boards have been quite reasonable in granting deferments to key employes. The companies at the same time have tried to be reasonable in asking for deferments only in such cases as they feel this is quite necessary.

In reference to the mines, the Mahoning Mining Company has installed two mechanical shovels and a drag loader underground, and is ordering additional mechanical loaders. This is because we believe that experienced and physically fit underground labor will continue to be hard to get during the war regardless of what steps are taken by Government employment agencies.

ZINC

HOWARD I. YOUNG, President
American Zinc, Lead and Smelting Co.

AT OUR Illinois and Ohio reduction plants we have experienced no shortage in total labor. The new men we have hired in the last six months, however, are inexperienced and, therefore, the results are less efficient than we normally have. The turnover at our Fairmont City plant where we have tried to add 100 new men in the last three months, has been excessive.

TRI-STATE

ZINC-LEAD

THE shortage of experienced miners in this district is becoming very critical. A large number have left to work at various Government defense projects. It is understood that labor scouts are in the mining field soliciting workers.

The loss of these skilled miners is hampering output at the mines, and is making doubly hard any efforts to reopen old and "thinner" mines, or to open up new mining properties. Probably 25 percent of present employes are newcomers, entirely unfamiliar with mining operations.

TEXAS

ZINC

HOWARD I. YOUNG, President
American Zinc, Lead and Smelting Co.

AT DUMAS, Texas, a number of our men have left the furnace department to take defense jobs, which pay more money and the work is less burdensome. This condition has curtailed our production temporarily by approximately 20 percent. We anticipate that in the fall, when some of these construction jobs are completed, our crews will then be back to normal.

FLORIDA

PHOSPHATE

CHESTER A. FULTON, President
Southern Phosphate Corporation

IN THE Florida Pebble Phosphate field there is not at the present time a labor shortage even though employment has been increased somewhere between 5 percent and 10 percent. The turnover at the present time is relatively small and has varied considerably (15 percent to 35 percent) during the first six months of this year with the four larger producers.

However, it is very doubtful there has been any production lost because of this turnover. The loss on account of the draft has been rather small in Florida, for prior to the beginning of the defense effort there was considerable unemployment amongst men in their early twenties. Volunteers from these unemployed filled the quotas of most of Florida draft boards. Naturally, this condition will change and Florida industry will lose a larger percentage to the draft in the future.

Losses of experienced men, such as dragline operators, machinists, and other skilled employes, to shipbuilding firms and other war industries, are increasing.

Therefore, while the Florida phosphate rock industry is not as yet experiencing a labor shortage, this is probable during the fall and winter months when there will come the peak demand for labor in the citrus fruit industry.

Some of the new employes taken on have been women, especially in the offices and laboratories.

TENNESSEE

ZINC

HOWARD I. YOUNG, President
American Zinc, Lead and Smelting Co.

WE ARE operating three mines and starting the development of a fourth one in the Tennessee District. To date, we have experienced no labor shortage and there has been no falling off in the efficiency at any of these properties.

In view of the fact that 94 percent of our employes are married and have dependents at these properties, the Selective Service draft has not taken many of our men. Our management has had fine cooperation from the local draft boards in securing deferments of those employes who were in important key positions.

COMMENTS

THE LABOR situation is bad and promises to get worse. Many observers believe that a Government law is urgently indicated without further delay to freeze labor and wages.

To meet the present labor shortage, employers have resorted to increasing wages to induce employes to leave their present jobs and this is becoming a vicious cycle. Government jobs under contract are the most serious offenders and the wages they are paying make it impossible for industries in their locality to compete. Most industries in order to maintain their production must raise their wage scales to a degree in an effort to try to hold some of their employes who are now leaving for Government jobs. This of course stimulates competition for employes among industries outside of war projects. The above is the basis for an upward cycle of wage increases and should be stopped at once before the matter of wages gets entirely out of hand. Increasing shortages of labor are accentuating this spiral and conditions are rapidly getting worse.

Substantial wage increases by industries and contractors on Government projects are making all employes in the mining industry restless and they are losing much time in going from one job to another in their effort to work where highest rates are being paid. The loss of time and production resulting from this condition is a serious item and we believe that freezing of labor is the only answer to stop it. Labor employed on vital and important war commodities should without question be under the same strict and rigid direction and control as men who have been drafted into the Army, as one is fully as important as the other to the winning of this war. It is of course evident that the time an employe loses in going from one job to another is only a small part of the time lost to overall war productivity since such things as special training in the job he is leaving, safety, experience and other things are direct causes of confusion and inefficiency.

United States Employment Bureau Can Supply Labor

One company is employing labor direct from the United States Employment Bureau and it is believed that if this were made compulsory it would be a means of stabilizing labor, obtaining employes best fitted for a particular job, stopping much of the present confusion and in general contributing to a much healthier employment situation than now exists.

The fact that the Government is drafting all able-bodied single men has an important influence in most mining communities. Many of these camps that formerly provided accommodations for single men must now make provisions for not only taking care of married employes but their families as well. This change has caused a housing shortage in most mining camps and many industrial centers. Preparation must be made to meet this situation by constructing a substantial number of additional houses. The matter of securing priorities for such construction work is difficult and the Government should recognize that employment conditions have changed and housing facilities for families constitute a real emergency, and that the Government in passing on priorities for this type of construction work should be more considerate.

With the labor shortage as acute as it is today, all industries, mining particularly, should make a special effort to prevent absenteeism of employes through accidents, sickness, subnormal working conditions and similar causes that either keep an employe from continuous work or result in impaired efficiency while he is at work.

The present urgency for maximum production of every kind of war commodities coupled with labor shortage would make it appear that if the country is really serious about winning this war in a short time, the 40-hour week should be out for the duration and the 7-day week or even longer working hours should become effective. It should be recognized without question that the supreme effort of all of us is required to win this war in the shortest period of time and that the very freedom we are fighting for is involved, therefore the matter of sacrifice and longer working hours should be a secondary consideration.

Deferment of Important Mine Personnel Must Be Recognized

With regard to the matter of deferment for key employes the experience has been that up to date the Government has been reasonable and considerate and we presume that other mines producing a vital war product have had the same experiences. It is hoped that the future policy of the Government in this regard will not be changed.

There is considerable complaint that Government civil agencies outside the armed forces are full of men of eligible military age who are obtaining draft exemptions. Older men, or physically unfit men for the draft, could fill many of the positions in question and there is no more reason why industry should be drained of this type of eligible men for the draft than Government agencies. This is a matter that is beginning to be closely observed, and is already drawing criticism.

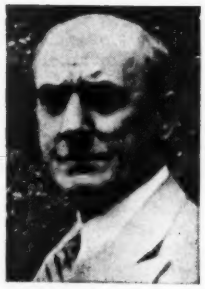
Old Age Pension Laws Prohibit Older Men from Seeking Jobs

Old age pensioner laws covered by state laws, are in most cases drafted so that a person forfeits his right to the pension if he has any other source of income. There are many men now drawing old age pensions who are physically able to replace younger men in certain kinds of work and would be glad to do so in the present emergency if they were not penalized. Some national Government action is indicated to cover this situation and thereby release available labor in this group.

It has been common practice for many employes to take advantage of the Government unemployment insurance compensation. They quit a job or intentionally get fired and take a vacation on Government payments before looking for a job. The Government has been very lax in closely checking cases in the past, and while it is true they are tightening up now, there seems to be no excuse at all for paying unemployment insurance for the duration.

NEW OPERATION REPLACES DEPLETED MINE

A mine of the Gulf Smokeless Coal Company which had exploited the Beckley seam for a number of years was approaching exhaustion, and the company's production was maintained by starting a new operation which used a large part of the old equipment.



By W. P. TAMS, JR.
President
Gulf Smokeless Coal Co.

ON account of the approaching end of the Beckley seam on our property in the Winding Gulf field of southern West Virginia, this company found itself obliged to develop the Pocahontas No. 4 seam in order to replace the daily output which was being lost from the Beckley mine. Plans were made in the winter of 1940-41 and development commenced in March, 1941.

The Pocahontas No. 4 seam at this place is slightly over 3 ft. in thickness, of excellent chemical quality, but of soft structure. Obviously hand-loading methods would be entirely too expensive in a seam of this thickness, since roof would have to be taken for height in every working place. It was, therefore, decided to make this mine completely mechanized with room conveyors and gathering belts, and to take rock for height only in the main haulageways where electric locomotives would have to go. A six-entry system was used so as to provide sufficient air volume without requiring the taking of roof in the airways. The general plan of development is shown on the attached cut in Fig. 1.

Belt entries, marked 1st Panel, 2nd Panel, and 3rd Panel, are driven from each side of the main haulways with a maximum length of 1,600 feet. Rooms are driven on each side of the belt entries using room conveyors and face conveyors with hand shoveling. All entries are driven with conveyors, but the face conveyors are only used in the rooms. The rooms are driven 35 ft. wide on 70-ft. centers, and the pillars are recovered. All entries and breakthroughs are driven 20 ft. wide. Three cuts per shift are made in each working place and coal loading is done on two shifts with supplies handled on a third shift.

An operating unit usually consists of six working faces which is four rooms and two entries. When a pair of entries is being driven, two rooms are worked at this same time until the headings have advanced far enough to provide four rooms. Fig. 1 shows the combination entry and room mining on the 2nd Panel (driving to the right), while the 1st Panel (driving to the left) shows a four-room operation. When the headings have

Surface buildings and preparation plant of the Gulf Smokeless Coal Company near Tams, W. Va.

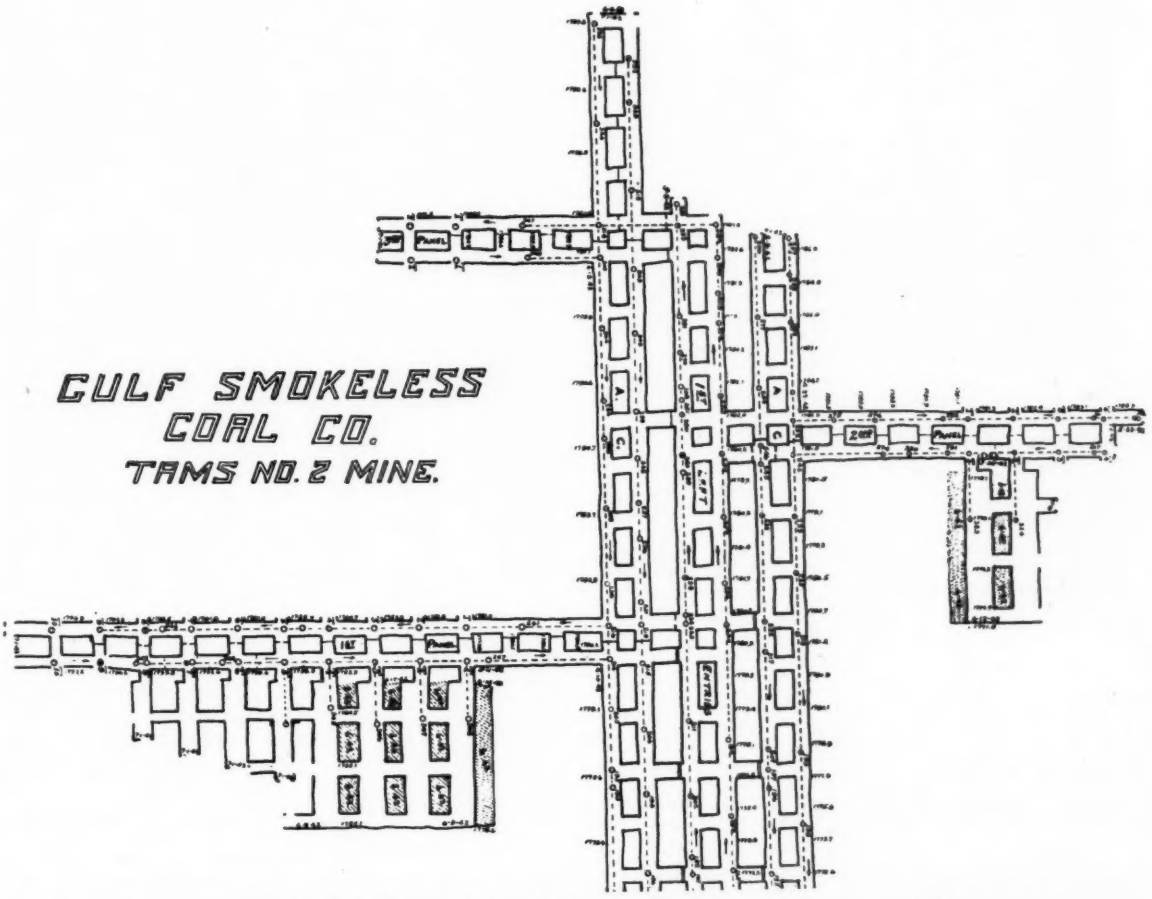


Fig. 1. A general plan of development at Tams No. 2 Mine. Belt entries marked 1st Panel, 2nd Panel, and 3rd Panel are driven from each side of the main haulways with a maximum length of 1,600 ft.

reached their maximum length of 1,600 ft., the rooms off one side have been completed in advance and the belt conveyor has been extended to this distance. The rooms on the opposite side of the entries are then mined retreating.

The pillars are recovered immediately after a room has been driven up; usually by open-end cuts. The room conveyor is set fairly close to one rib, with a line of cribs on the opposite side as illustrated by the photograph. These cribs are cushioned on slack so as to be recovered after the weight develops. The roof action has been favorable; the top generally breaks when the pillar has been drawn about half way back to the entry; sometimes a second fall may occur before the extraction is complete, but in any case we have encountered few interruptions from roof caves.

The face conveyors, room conveyors and belts are Jeffrey Manufacturing Company equipment and the mining machines are also furnished by this company. The locomotives used for haulage have been brought down from the Beckley seam and the mine cars used are also the same cars that had been in use in the Beckley seam. The mine is ventilated by a Jeffrey Aerodyne fan with a capacity of 150,000 cu. ft. per min. against a 4-in. water gauge, but is now being operated with a 25-hp. motor at a capacity of 80,000 cu. ft. per min. against a ¾-in. water gauge.

The haulage entry on which the coal is loaded from belt conveyors into mine cars is driven 23 ft. wide. An average of 3 ft. depth of bottom is taken so as to give 5 ft. clearance over rail. The rock is loaded with a Goodman Type 136-A entry scraper loader.

The haulageway is double tracked, with tracks 11-ft. centers, gauge of track is 44 in. Sixty-pound rail is laid on 6 x 8 in. x 6 ft. ties, spaced 2-ft. centers. The cross-overs between tracks are Bethlehem Steel Company's No. 4 turnouts with manganese steel cast frogs. Brown-Fayro Company's Type "Brownie" hoists are used to load the mine cars in continuous trips. The track arrangement and the location of the belt conveyor discharge points are shown in Fig. 2.

The power lines for each belt entry consists of two positive 4/0 insulated cables, supplying the mining machines, drills and face conveyors. A separate 2/0 insulated cable is used to supply power to the room conveyor motors. This is done in order that cutting and drilling coal is not interfered with when the belt conveyor is shut down to change trips or for any other reason. Automatic reclosing circuit breakers made by the I-T-E Circuit Breaker Company will be installed at each belt entry sectionalizing the mine so that power interruptions on any belt entry will not affect the other sections of the mine.

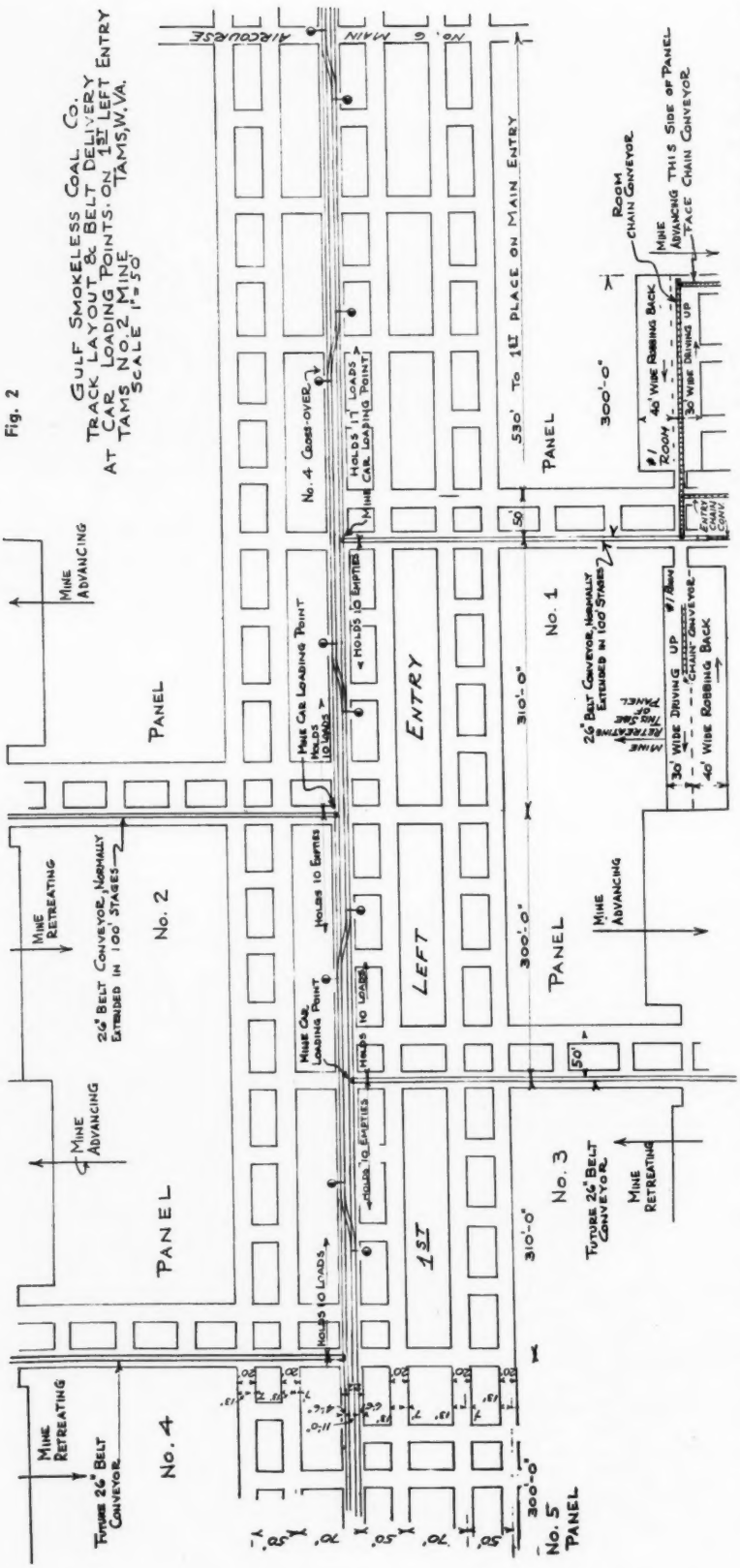


Fig. 2

Capacity of New Preparation Plant Will Be Doubled

The coal produced from this seam has a very high fusing point of ash and is therefore excellent as a by-product coke coal. The fusing point of ash runs over 2,900° F. and the ash content averages about 5 percent. While the coal is soft in structure, about 30 percent will pass over 1¼ in. round hole screens, and about 25 percent is included in the sizes between 1¼ in. and ¼ in.

The tipple is of creosoted wood construction and was designed and built by our own organization, using preparation equipment of several manufacturing companies as described later. Our preparation methods follow usual accepted practices; primary separation is by shaker screens, with secondary screening by vibrators; hand picking is used for the larger sizes and the smaller sizes are cleaned by mechanical separation. Slate and refuse are conveyed to a bin and hauled from there by trucks to the rock dump.

The coal is dumped at the tipple by a Link-Belt Company rotary dump to which the cars are fed by a Kanawha Manufacturing Company car feeder. The coal is handled by Jeffrey belts and is screened through 3-in. round holes on shaker screens. The size above 3 in. is hand-picked on a picking table. The coal under 3 in. is screened through an Allis-Chalmers suspended horizontal screen and the ¼ in. x 0 fine slack removed. The ¼-in. x 3-in. size is then passed into two Menzies washers after which it is sized on a dewatering screen which separates the washed coal into stove, nut and pea sizes.

These three sizes are carried by a three-compartment conveyor over to the loading boom where they can rejoin the plus 3-in. lump, or alternatively either the pea, or the nut, or both together can be loaded on a separate track, or can be taken by a cross conveyor back to rejoin the fine slack. The coal is carried by belt to a slack bin holding approximately 75 tons from which bin the slack is loaded by undercut gates into railway cars. The tipple is equipped, therefore, to load 1¼-in. lump, stove, nut, pea, nut and slack, pea and slack or straight ¼-in. fine slack.

The present output is approximately 800 tons per day and it is planned to increase this to 1,500 tons per day. Naturally it is difficult to complete the development of any mine under present conditions due to difficulty of obtaining labor and the even greater

Coal cutting machine undercutting the 3-ft. Pocahontas No. 4 seam. Three cuts per shift are made in each working place

difficulty of obtaining equipment necessary. Fortunately the company had purchased the greater part of the equipment before the country was engaged in war and it is believed that sufficient additional equipment to complete the development can be bought since the entire output of this mine goes to defense industries. In the construction of the tipple and in the equipment of the mine, every possible use was made of equipment already available. The greater part of the structure of the tipple and of the conveyors, washers, loading boom, etc., was equipment salvaged from the company's Hotcoal mine which was worked out in 1938.

Short conveyors are used to load the coal. Loading is done on two shifts with supplies handled on the third

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The Modern Foreman Looks in The Mirror

As he appraises himself, he finds the war effort has placed greater responsibilities on him for mine safety and other phases of his daily work underground.

A SUCCESSFUL accident prevention program must have as its foundation modern foremanship. Without this requisite a safety program has little chance to succeed. The management may be liberal in providing the essentials to safe and efficient operation, but if the supervisory force does not have the ability to lead and direct the work of those under their supervision, much of the management's efforts are wasted. Unfortunately there are many foremen who are that in name only, and lack many qualifications necessary to achieve successful foremanship, particularly in wartime.

These approaches to the accident problem, no doubt, have brought some measure of success, but even with the full and sincere support of management they contribute but a part in the industry's never ending effort for mine safety.

There is no doubt that the underground foreman is confronted with a much more complex problem in preventing accidents than that of any surface occupation, because his men usually are scattered and he is able to observe their actions for only short periods during the shift. Whatever success in accident prevention he attains must be gotten through good will and by educating the workers in safety. In order to educate others he must first educate himself and must possess the qualifications that will stamp him as a leader.

What then are the qualifications necessary to successful mine foremanship?

The successful foreman will be of positive character and have such nature that those over whom he exercises authority will know that he means what he says. His orders will be plain, concise and clearly stated; in a manner which will eliminate the possibility of misunderstanding.

The successful foreman will have the ability to lead and direct the work of others. He will be able to take the worker apart, so to speak, determine his faults and his good points. This will aid him in properly classifying his men.

The successful foreman will arrive at a definite conclusion soon after a problem is put before him. Too much delay will not only destroy the value of his work but that of his men also.

Honesty and Dependability

The successful foreman will be honest and dependable. He will not allow himself to get into a position from which he must resort to an untruth or to unfair methods to extricate himself. When he commits himself to a promise he will fulfill that promise to the best of his ability. He will not promise a worker additional compensation for some job and then promptly forget about it. He will also convince the worker that his interest in his safety and welfare is sincere.

The successful foreman will be discreet. He will be understanding and realize that the workers are very much human beings. There may be widely different personalities among them but never-the-less they possess all of the human characteristics. He will be fair in his criticism and avoid arguments, also guard against outbursts of temper. He will realize that there are always chronic grumblers and seemingly discontented workers in every group who in many instances do not have a grievance but use this method to keep the foreman on the defensive. Indiscreet and bullying methods in dealing with workers are outmoded and have no place in the modern accident prevention program.

The successful foreman will be resourceful. He will have the ability to meet and properly cope with situations as they arise. He will give careful consideration to suggestions made by the worker. He will give immediate attention to all unsafe conditions reported to him by the worker. If, in his opinion, the condition is unsafe he will correct it as soon as possible. If, however, he considers it not unsafe he will inform the reporter and give his reason. This encourages and stimulates interest in safety among the workers.

The successful foreman will be a strict disciplinarian. He will be firm in his insistence that all laws are observed and that all instructions are carried out immediately. He will not overlook a violation today and then inflict a penalty for the same violation tomorrow. He will never ask a worker to violate a rule for the sake of production.

The successful foreman will have organizing ability. This is a very essential quality. To combat accidents it is necessary to have the working force so well organized that each will know his proper place and duty.

The successful foreman must be self-confident and have sound judgment. By this it is meant that he must have the power or faculty of forming decisions, especially correct decisions. In many instances the direct cause of accidents are attributed to the failure of the foreman to exercise good judgment.

Some might say that a foreman such as described in the foregoing paragraphs is only a creation of the mind, but for proof that he exists one need only examine the performance and safety records of mines operating under like conditions. The better performance and accident record is the answer. Indeed he may be found by examination of the individual records of the foreman in the same mine.

True there are many good foremen who are handicapped by the management's short-sighted efforts to pare costs by providing insufficient and inferior materials which are essential to safe and efficient mine operation. However, with the State and Federal inspection departments placing more and more responsibility for the safety of those under his supervision the foreman has no other alternative but to demand suitable and sufficient material and equipment necessary to the safe operation of the mine.

The mine foreman who possesses the aforementioned qualities not only keeps injuries to a minimum with efficient production, but promotes good will, harmony and loyalty between employer and employe, which is so vitally necessary in this period of our country's greatest struggle against aggression and oppression.

MINING COAL IN THE OHIO RIVER

The unique operation employs a river dredge that digs coal from the Pittsburgh No. 8 seam which outcrops on the bottom of the Ohio River. The cleaning plant floats along side of the dredge and is equipped with modern screens and conveyors that prepare fuel for an industry nearby.

By EVERETT DRENNEN
Vice President
Rivercoal, Inc.

MINING a coal seam by dredging is a decided departure from usual coal mining methods and the operation described here is perhaps the only one of its kind in existence. We are using a sand and gravel river dredge equipped with a boom and dipper to take coal from the bottom of the Ohio River—the natural solid seam and not floating coal from mines or washers that has settled in the river bed.

Along a 15-mile stretch of the Ohio River, between Wheeling, W. Va., and Powhatan, Ohio, the Pittsburgh No. 8 seam out-crops several feet below water level and in many places forms the river bottom. The seam is dipping at only a slightly greater degree than the river fall. Starting at the upper end of this area the amount of "overburden" between the coal and the water gradually increases as the river flows southwest. Prospecting has indicated that in this 15-mile length there are over 2,000,000 tons of recoverable coal 8 ft. thick with a maximum overburden of 25 ft. which varies from deposited sand and silt to natural strata. The silt is easily removed by the dipper and we believe that where the natural strata occurs, it will have been softened by the action of the water so that it can be stripped from the seam in most places without drilling and shooting.

From the known geology of the region we originally assumed that the coal seam underlaid the entire river bed, but before starting on the construction of the plant, considerable prospecting was done with diamond drills. This showed that a large proportion of the seam had been eroded by the river but in this 15-mile distance there still remain a number of large bodies of solid coal. It is interesting to note that these coal areas occur where there has been protection against erosion which in all cases is indicated by a cliff formation. This prospecting also indicates that the seam has a fairly uniform thickness of about 8 ft. with the characteristic Pittsburgh partings. Fortunately, no "roof problems" exist and it is possible to mine the entire seam without following the usual underground practice of leaving top coal to form the mine roof.

For some years, attempts have been made to mine this coal, but because of the lack of proper equipment, these attempts had not been altogether successful although they had indicated that, with proper methods and equipment, an operation could be installed that would be practicable and commercially profitable. About a year ago steps were taken to install such an operation; a lease was effected on a royalty basis with the Public Land Corporation of the state of West Virginia; our company was organized under the name of Rivercoal Incorporated, and plans were put into effect for the construction of the necessary equipment to dredge and prepare the coal for market. This construction was completed and "mining" began about June 1, 1942.

All of our equipment is floating and consists of several units, the two principal ones being the dredge and the cleaning plant. The dredge, of course, is self-contained and the coal cleaning plant is likewise self-contained, mounted on a barge and with preparation facilities which will be described later. We also have a flat barge decked over which serves as a "supply yard." These three units are shown in Fig. 1. In addition to this semi-stationary equipment we have four coal barges for transportation to market and also, under lease, a river tug. This is used mainly for towing

The complete "coal dredge" consists of two floating barges. One is equipped with a dipper shovel, and along side of this unit is the self-contained cleaning plant. Another barge serves as a "supply yard." Spuds, similar to those used on gold dredges, keep the barges anchored during operations

the coal barges, but is also employed to move the plant when more than short distances are involved.

Dredging Equipment

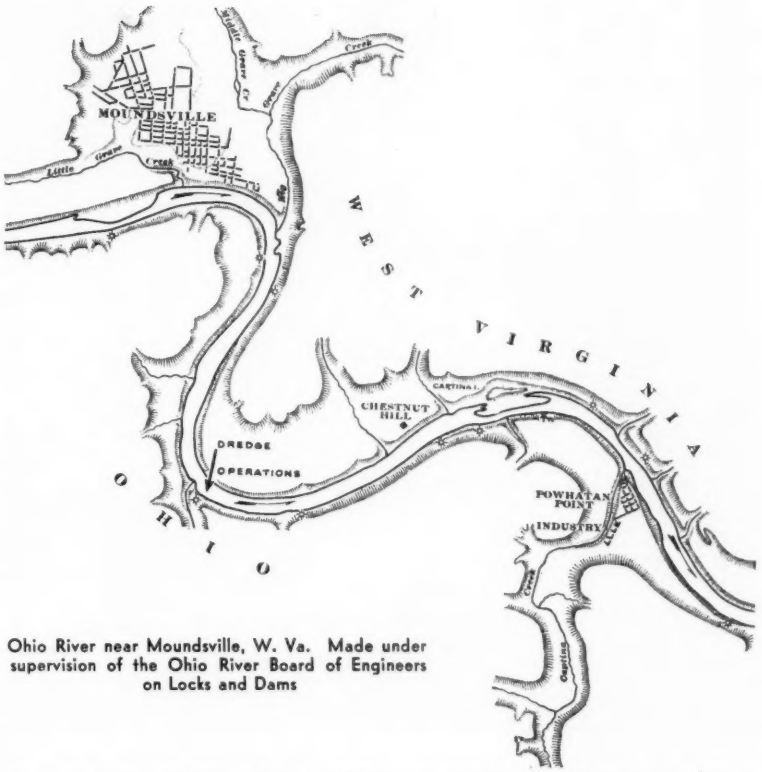
The principal job is to remove the coal up from the river bottom, and since this type of operation is unique for the coal industry, we had no precedent to use as a guide. Open pit mining is the nearest similarity, but open-pit methods did not apply.

However, river dredging of sand and gravel is a long-established industry and we, therefore, felt that dredging experience could be used at our operation. Consultations with sand and gravel companies confirmed the practicability of our idea and resulted in an agreement with the Monongahela and Ohio Dredging Company whereby this company is now contracting with us to strip and shovel the coal from the river bottom and place it in the hopper on our cleaning barge at an agreed rate per ton.

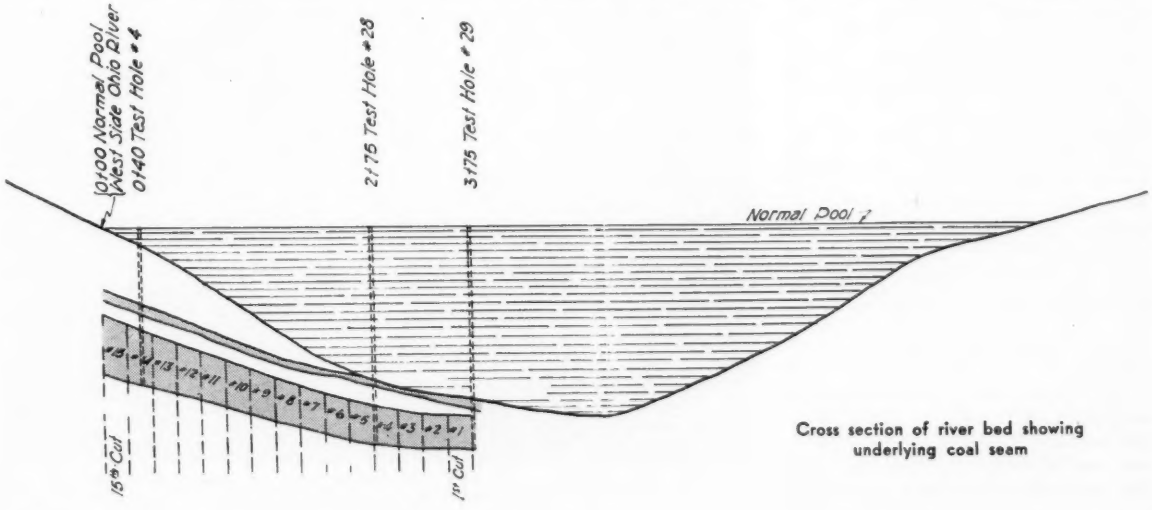
The dredge is the usual river type with a boom and 2½-cu.-yd. dipper. The present boom has a maximum digging reach of about 22 ft.; the water depth is normally not over 12 ft., and the seam is 8 ft. thick, which will allow us to mine coal up to an overburden of around 2 ft. in 12-ft. water. As additional overburden is encountered, the dipper stick will be lengthened. So far we have operated where the seam is the actual river bed and consequently there has been no overburden beyond a small amount of sand and silt.

We were in some doubt as to how well the coal could be dug up with the shovel dipper and had rather expected that drilling and shooting might be necessary; naturally we wished to avoid this if possible and so far at least, we have not experienced any difficulty in digging. However, instead of attacking the entire seam thickness, the dredge shovel works down from the top of the seam taking about 2 ft. of coal at each lift. The shovel teeth are manganese steel with the usual square chisel point; and in case difficulty should be encountered, we have considered the possibility of a diamond-shaped tooth point.

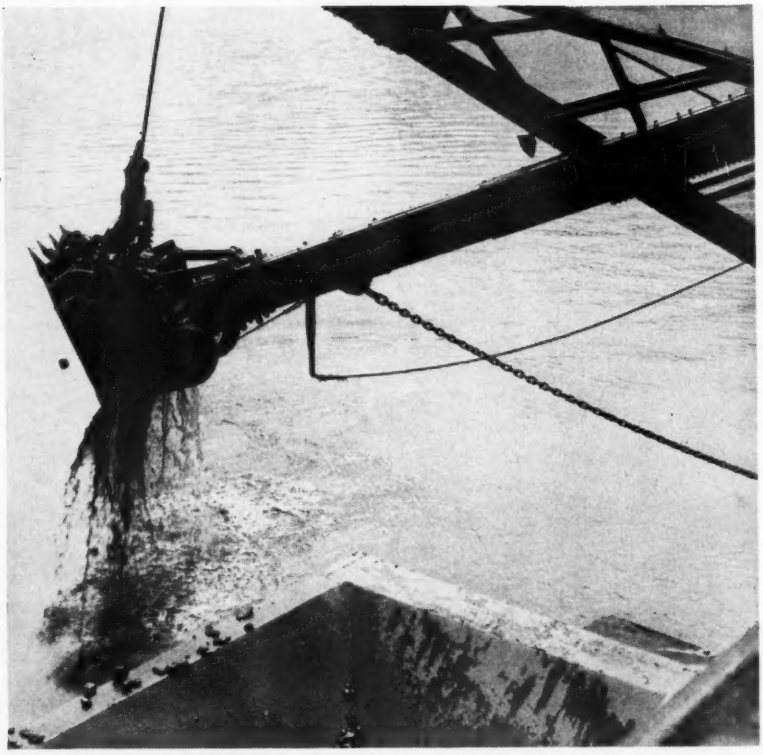
Although the dredge is actually floating, it is nevertheless necessary to give it a foundation to protect against the thrust and lift of the dipper while the shovel is in operation; otherwise the dredge might be pulled down under water or at least moved out of position. Stability is provided by means of movable vertical columns or posts, about 18 in. square, called



Ohio River near Moundsville, W. Va. Made under supervision of the Ohio River Board of Engineers on Locks and Dams



Cross section of river bed showing underlying coal seam



Coal is dug from the seam with a 2½ cu. yd. shovel equipped with manganese steel square chisel point teeth. Digging reach of boom is about 22 ft. and depth of the water is about 12 ft.

"spuds," which rest on the river bottom and are fastened to the side structure of the dredge barge. Two of these are at the end where the shovel operates, and a third spud is located at the rear. They are similar to the spuds used in anchoring gold dredges. Spuds are also used to anchor the cleaning plant.

The dipper bucket is 2½-cu.-yd. capacity which means about 1¾ tons of broken coal. While we have not yet established any sustained operating record it seems indicated that the average time for a complete swing or loading cycle will be about 45 seconds, which would give a digging capacity of close to 140 tons per hour. Our coal barges hold 650 tons of coal and our expected production rate is one barge per shift. At present we are working single shift only, but in the future may operate double shift.

Coal Preparation

The preparation plant is mounted on a barge 34 ft. wide by 120 ft. long and consists of shaking screens, vibrators and a wash box, together with the necessary transferring conveyors; all this equipment was furnished and installed by the Jeffrey Manufacturing Company. At the present time only R.O.M. is being loaded and the screening is to make the size separation necessary for cleaning.

The flow of the coal through the plant is parallel to the barge length; the dredge dipper discharges into a hopper (see Fig. 2) located at the extreme end of the barge and under this hopper there is a short apron conveyor which elevates the coal and discharges onto the primary shaker screens which remove the plus 4-in. lump. The lump is taken by another apron conveyor, which is used as a picking table (see Fig. 3), to a cross conveyor that loads into the coal barge (see Fig. 4). Two men are stationed along this picking table to remove slate.

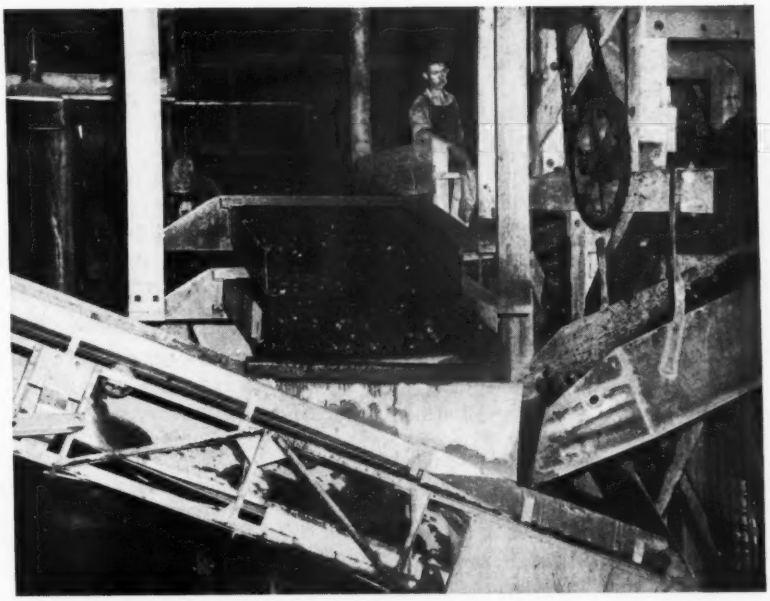
The minus 4-in. product goes into a wash box; the refuse is discharged into the river and the clean coal passes over a two-deck dewatering screen; the upper deck has 1-in. round openings while the lower deck has slotted perforations. The dewatered coal discharges onto the cross conveyor (see Fig. 5) where it is mixed with the 4-in. lump and the combined cleaned product loaded as R.O.M. into a river transport barge. The cross conveyor

Barges are brought alongside of the cleaning plant and loaded with coal by means of a conveyor belt

is a portable type, about 30 ft. long, and is so arranged that it can discharge into river barges either to the right or left of the cleaning plant.

The "tipple" has its own power plant consisting of a 150-hp. boiler connected to a reciprocating steam engine which drives a 100 kw. generator. Alternating current at 440 volts is used for the motors on the conveyors and screens, and a transformer reduces the current to 110 volts for electric lighting and small auxiliary motors.

Our cleaning problem is somewhat different from that of the usual deep mine or open-pit operation, as the coal, being dredged from the river bottom, is, of course, extremely wet. This wet condition, however, is unusual only in the main feed and the 4-in. lump; the moisture in the washed product is directly similar to other washed coals. In the early stages of our operation we experienced some difficulty with the water in the main feed hopper but a sump is installed under this hopper and also under the first elevating conveyor which permits drainage at these points. By the time the product passes over the primary shakers, the dewatering is fairly complete and only the surface moisture remains. Altogether, our preparation difficulties have not been too great and we feel that we are preparing a satisfactory product. So far, we are making strictly a washed R.O.M. product and not attempting to load separate sizes, but are nevertheless much gratified by the amount of lump and coarse coal obtained.



Modern screening equipment in the cleaning plant supplies a desirable product for use in a nearby industrial area. Dust and gas offer no problem at this "coal mine"

Our labor problem is very simple. The dredge has a crew of six men, the cleaning plant employes two slate pickers, one electrician, one barge loader, one fireman, and one general helper; the tug boat has a captain and a deckhand. This makes a total of 14 men for a shift operation, all of which is under the direction of a plant superintendent. The crew on the dredge and tug boat are experienced river men and the remainder of our force have required only a small amount of training to learn their jobs.

The outlet for our coal is close at hand, as there is a large industrial area in this vicinity, and several large central power plants are located along a 30-mile length of the river. This provides a ready market within easy towing distance and we anticipate no difficulty in disposing of our product. To supplement river transportation, we also have an unloading dock where the barge coal can be transferred into railroad cars on the B. & O. Railway.

After many years of deep mining it is a novel experience to be producing coal without having to give thought to haulage, roof support, ventilation, and the numerous other facilities that are required underground. Perhaps we will have equally severe problems in "river mining" but while our operation is still in the initial stage, we feel that the experimental period has been passed and that its practicability has been proven. This does not mean to imply that all difficulties have been solved and we fully realize that unanticipated conditions are certain to arise which will have to be met as encountered.

The picking belt in the rear shows that a substantial amount of lump and coarse coal is recovered in this mining operation

MAINTENANCE

Mine operators and manufacturers agree that top executives must give more attention to this phase of operation. Cooperation in the centralization and exchange of supplies among coal mining companies in a district is a trend noted in the industry. Improvement in organization of facilities and attention to repair-records will contribute to greater efficiency.

COMMENTS BY THE OPERATOR

By C. V. BECK
Florida Coal Co.

MAINTENANCE is one of the leading problems in the coal industry today. Coal mines are operating without the usual slack summer period this year, during which time the general overhauling of equipment is customarily done. This makes the problem of maintenance more difficult than usual, but when this fact is coupled with the difficulty of maintaining a full crew of good maintenance mechanics, the problem really becomes critical. Good mechanics always have been in demand in normal times, but now with a good percentage of the working force called into the armed services and with defense industries bidding for mechanics above the coal mining union wage scale, the problem is indeed becoming very difficult.

Getting repairs made in outside shops also has become difficult due to their backlog of unfinished work. This situation forces many coal operators to do more and more work in their own shop, with a smaller crew.

So far, supplies for maintenance and repairs have been relatively simple to obtain because the coal industry has received appropriate priority rating for such things. Nevertheless this feature has caused anxiety among operators because some fear it may not last. Therefore, conservation has been vitally necessary and desirable to make old parts last their maximum life by welding and other methods of shop repair. The necessity for getting the maximum out of equipment makes it important that the best practices be maintained not only to prolong the life of all equipment, but to improve, if possible, its initial performance. Many are doing this by using a higher type of materials for repairs and hard surfacing many parts of worn equipment. This is often difficult under present conditions, but it is something always to bear in mind under the present circumstances, as it is often possible to renew and replace, even now, with stronger and higher quality materials than originally used which will cut down the necessity for future maintenance.

The above suggests the general problem, but there does not seem to be any easy solution in sight. Coal mines that have been operating at capacity and will continue without a let-up, are finding a problem that is causing gray hairs in the industry. Most of the maintenance forces in the industry are putting in a great deal of overtime and are, in fact, gladly working practically to the limit of human endurance, to help win the war.

Certainly the coal industry must do everything within its power to protect its maintenance and shop forces. It is necessary and desirable that all coal operators should work closely with the local draft boards to prevent the taking of their key maintenance men (and shop men) and obtain whatever reasonable deferments can possibly be made. It is also quite obvious that it is desirable to keep a fuller than usual shop and maintenance crew and institute a regular training program for the new men. One source of relief seems to be due to the automobile situation as good mechanics, in some instances, are becoming available from the various local garages, they often make good shop hands around a coal mine with a short period of training.

The most difficult problem of all is the fact that defense industries are often offering twice as much as the coal mining union wage scale for good mechanics. This is indeed a difficult problem to meet. It is quite obvious that coal operators must attempt to do more in their shops than ever before. In other words, they will have to do more with less. There is no easy solution to such a situation except that the coal operator must devote more thought and supervision to his maintenance force than ever before, and also institute a regular apprentice school and keep as many likely recruits in it as he can find.

It has become necessary to train welders. Many local shops are now performing almost miracles in welding and metalizing and are doing things that would have been undreamed of even five years ago. Adding metal with welders to worn shafts and worn spots and turning them down to proper size is now almost commonplace. Building up teeth in worn and broken gears with electric welders is not only saving a great deal of money in maintenance, but in many instances is saving invaluable time. Necessity is the mother of invention and we are all learning many new tricks to keep our properties in operation. The author recently saw a very large cast iron gear broken in six places with ten teeth out, which would have shut a large property down for at least ten days if a new one had had to be procured. Any thought of repairing such a mess a few years ago would have been considered ridiculous. However, between a combination of brazing and welding it was repaired and was put back together. Bronze was added where the cast iron teeth were broken out, the teeth were recut and the same was back in operation with a loss of only one day's time.

Maintenance is, unquestionably, one of the most important problems confronting the industry at the present time and one that top executives will be forced to give much closer and more personal attention than ever before in order to keep their properties operating smoothly and at present capacity.

IN WAR TIME

COMMENTS BY THE MANUFACTURER

By E. R. RANKIN
Goodman Manufacturing Co.

THE equipment in mines today is a far cry from what it was back in the mythical "good old days." Times and conditions have been changing along with changes in coal and other mining equipment. Demands on machinery have become steadily greater and more complex, and it is, therefore, more perfect and complicated. Consider the punchers, the breast machines, and the relatively simple shortwall machines of early days, and then look at the marvelous cutters in use today. The care and maintenance of the modern explosion-tested type of gathering locomotives is quite different from taking care of a mule, or the little old open type gathering locomotives of yore.

Before the coal industry had caught its breath from the devastating depression of the past decade it found itself in the midst of bewildering circumstances. There was a sudden demand for more coal, and since the industry had not completely retooled, the increased tonnages had to be obtained by using new and old machinery. New equipment is more complicated and today personnel has not become thoroughly familiar with its care and operation. The increasing shortage of labor makes it imperative that available workmen have their machinery in shape so there will be a minimum of lost time in producing coal.

The maintenance problem varies with each property, and it would be unwise to lay down any rule-of-thumb method or program for its solution. I want to tell you of some observations I have made, some impressions—good and otherwise that I have gained—some ideas I have heard and those I have formulated myself in my travels from mine to mine. Some may apply to your case. May I suggest that the higher your position with your company, the more closely you check them, to be sure they do not apply before discarding them.

When we consider organization we mean organization of the following things: Personnel, facilities, schedules, records, supplies, and inspections.

Organization of personnel sounds simple, but it can be tricky. Who is the maintenance personnel? Consider your property or properties and decide in your own minds the answer to that question. Frequently I have been told that the chief electrician or master mechanic, plus the outside shop crews, plus the inside electricians and mechanics, constitute the maintenance personnel. They are undoubtedly the full-time members of the maintenance department, but I believe that organization of personnel should include every position represented in the membership of your association. Their inclusion influences their responsibilities in the care and operation of equipment and fosters greater cooperation between the operating department and the maintenance department.

Modern Shops are Being Installed Underground

Organization of facilities obviously varies with each mine, but in each case they should be adequate for the work necessary. You may be interested to know that a trend is developing of moving back the "mine shop" underground. This reduces time necessary to get disabled machinery into the shop. Some of the larger companies are installing a modern shop underground and in addition are rehabilitating small shops to act as section service stations where minor repairs can be made.

Whether your shop is large or small, elaborate or simple, keep it clean and orderly. One company has a rule that each shift knocks off a few minutes early and cleans up the shop. All dirt is put into covered containers reserved for it. All tools are put back in their places. Each man is required to have a prescribed set of tools, which he places in his locker. Each shift comes into and leaves a clean, orderly shop. Give your shop plenty of light. Whitewashing the walls and ceiling will help considerably.

Company-owned tools should be plentiful and of high quality. Each should have a definite storage space when not in use and workmen should be trained to return the tools to their places when they are finished with them.

Provision should be made for the convenient storage of catalogs, suitable literature, and blue prints with a work table on which these can be used or studied.

Provide metal containers with lids for clean waste. Other containers should be provided for dirt and scrap metal. These should not be allowed to accumulate, but a definite schedule should be set up for their removal.

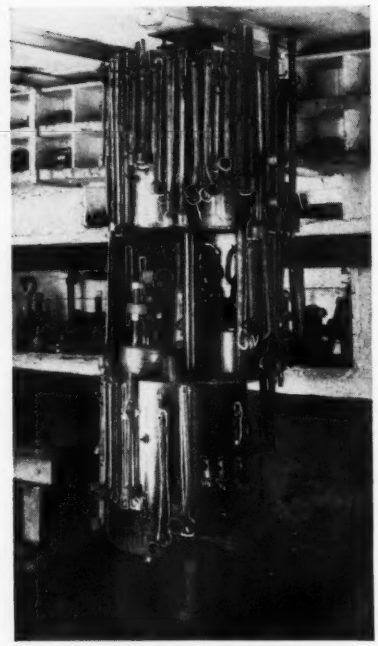
Provide frames and glass so that wiring diagrams, lubrication charts, and assembly drawings can be hung on the wall for the reference of the workmen. Some shops have a glass-covered bulletin cabinet in which the workmen put their prints, thus keeping them clean and usable over a longer period of time.

If possible, provide rooms adjacent to the shop for the storage of lubricants, supplies, and tool lockers for the mechanics.

Proper Working Schedules and Maintenance Records are a Must

The arrangement of a working schedule is vital to efficient maintenance practice. Adequate working forces should be maintained at all times if possible and schedules should be laid out so men will have some idea when and where they will be working each week and what free time they will have, barring emergencies.

It has been said that out of mines come more *opinions* and *guesses* and less *facts* than anywhere else. I have been observing records for some time and I am convinced we could stand with a reorganization and an amplification of our maintenance records.



A place for everything and everything in its place

People insist on a speedometer showing mileage covered, and they carefully check and record gas and oil consumption and tire mileage, and praise or condemn the car, the gas, or the tires according to the records. All too frequently fact-finding is not available concerning mining machinery. Inquiries usually develop that cutter chains, gears, armatures, etc., last about so long in terms of months or years but not in terms of tonnage produced. Adequate records are a vital part of maintenance, and they will, if properly used, more than pay for themselves.

Before the maintenance department can really go to work some supplies must be on hand. It is obviously important to carry in stock as many assemblies as possible. Then when something goes wrong, replace the damaged assembly and repair it when and where a thorough job can be done, and put it in stock for future use.

The maintenance I find in my travels can be classed as good, bad, or indifferent, and a study of this long ago led to the conclusion that two distinct programs are being followed. Where bad or indifferent maintenance exists, invariably the maintenance department is functioning on a breakdown basis. Such a shop apparently believes in the policy of "run it till it stops and then patch it up and get it going as soon as possible." Electrical and mechanical failures seem to have a habit of occurring at the wrong time. Just when everyone is hurrying to make up lost time and tonnage, bang goes some piece of equipment that has probably been in distress for some time and it just couldn't stand the extra push. A demand arises to get the unit going again the shortest possible time with little regard to the adequacy of the repairs. The thought exists that tomorrow it will be taken out and properly repaired and badly worn parts will be replaced, but in a breakdown maintenance crews are, as a rule, so busy going from one machine to another they don't get back to the repaired machine till something serious happens again. In other words, "tomorrow" never comes. While indifferent and inefficient mechanical forces have a tendency to drift into this program of maintenance, I know for a certainty that some good ones have it forced on them. These fellows will tell you that except in the case of "any port in a storm," patchwork is false economy. Lack of proper records prevents these poor devils from proving to their bosses that time, money, and lost tonnage would be saved with sufficient time out for a good job instead of a series of outages for piecemeal repairs or patchings.

A program of preventive maintenance is the correct program to follow. Catch it before it happens.

Cooperation Should Exist in All Departments

An important essential for this program is the existence of mutual respect and a spirit of cooperation between the full-time members—i. e., the master mechanic and linemen and electricians—who make up the maintenance department and the bosses of the operating department. Mine machinery must produce the greatest possible tonnage during its lifetime, in the safest possible manner, and with least possible cost of labor and material for upkeep. Aside from their natural pride in their products, competition alone would force manufacturers to contribute those qualities in their machinery. The operating department and the maintenance department should recognize and respect the other's duties and responsibilities in accomplishing this goal of performance. Where there seems to be a confliction of ideas, a simple, sincere discussion of the conditions and facts involved will usually bring the right answer. If either group is unnecessarily arbitrary it will be most unfortunate.

The Purchasing Agent Wants Facts Not Opinions

There is another department that greatly influences maintenance. I refer to the purchasing department. From my contacts with it I know that its ultimate aim is the same as yours and the manufacturer's; that is, low-cost upkeep. But it doesn't have your advantage of being on the ground and of having first-hand knowledge of what takes place or of results obtained with the material it furnishes you. It tells me that it *depends* on *you* for guidance. If article "B" costs twice as much as article "A" it is willing to buy it for you if you have real records—there's that word "records" again—to show that article "B" produces twice as many tons of coal as article "A" before landing on the scrap pile. Don't expect the purchasing department to always listen to guesses and opinions. Remember it forms opinions of its own from what it reads in catalogs and from what it hears from visitors. The facts and information thus secured, while usually true, are mostly based on averages. If you have logical records to offer you are giving just what the doctor ordered—cold facts from your own experience in your own mines and not guesses or opinions or averages. I mention these things because my work takes me to both mines and main offices and I get the viewpoints of all departments. I think you would be surprised to know how many times a chief electrician has told me he could show better results if it weren't for the junk furnished by the purchasing department. Questioning develops that he told them once or twice and they didn't listen so it wasn't his fault if they thought they knew more about it than he did. Now I don't think that attitude is quite fair. The fault may have been in the manner in which the "telling" was done or in the lack of facts to support the reasons given. Purchasing departments, I believe, subscribe to the slogan a rubber company put on a calendar one year, "Quality will be remembered long after price is forgotten," but they all seem to be from Missouri and have to be shown.

Preventive maintenance means studying, thinking, planning and training. It means organizing personnel, materials, and time. It calls for education of crews in their duties and fixing responsibilities, for everyone's

job is nobody's job. It calls for scheduled inspections and reports. It means eternal vigilance. Aside from some accidental repairs, preventive maintenance will generally come under two heads: Planned overhauling and planned rebuilding.

It is not uncommon for these two terms to be used interchangeably. The difference lies in the degree of thoroughness applied. Overhauling is the periodic taking out of service a machine, opening it up, carefully inspecting its parts to see if any are showing distress from any cause, replacing those that need it.

Rebuilding is overhauling plus and should be periodic. It means dismantling completely, cleaning all parts for a careful check of each from the viewpoint of its condition and its fit and mesh with its sidekicks. When the machine is reassembled it should be in A-1 shape with all wearing parts fitting properly and lost motion due to wear reduced to a minimum. Rebuilding calls for more sound mechanical judgment than does overhauling. After the reassembly of a rebuilt machine there will undoubtedly be among the replaced parts some that are suitable for use as renewals in case accidental repairs are needed at a future date. For instance, a pinion may have given a poor fit on a new shaft and the wear on its teeth precluded its having a good mesh with the new gear it turned, therefore it was replaced. It can still be useful on some other machine with a worn gear in case a shock load breaks a similar pinion. These parts have already been charged to coal, therefore they should not go on the supply-house inventory but be turned over to the maintenance department for use in repair work or even in overhauling.

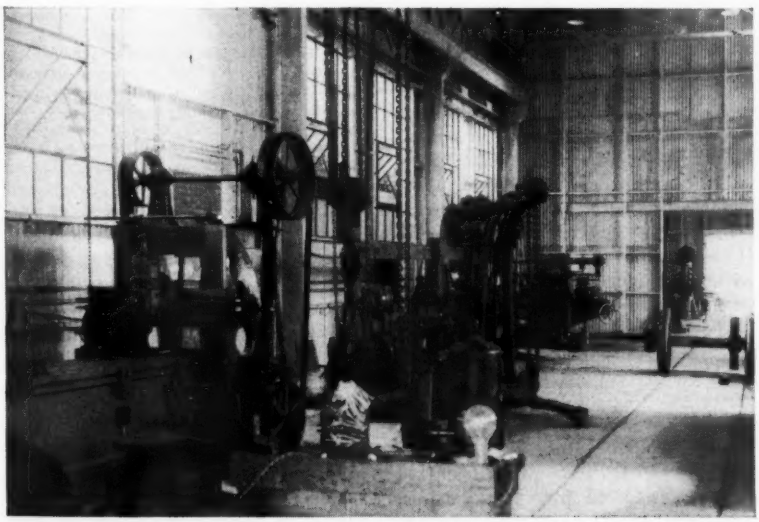
This underground electrical supply room is well organized. A filing cabinet is available for bulletins and records

To insure the greatest efficiency in this program one needs to establish a yardstick. This should be on a tonnage basis rather than a time basis, then we can forget, to some extent at least, how many shifts a day, a week, a month, or a year the individual machines work.

The planning end of the program calls for the coordination and cooperation of three departments—operating, mechanical, and purchasing. The operating department should furnish the data for the yardstick and should lay their plans to deliver the machinery to the mechanical department in due course. The maintenance men should, from their records, know when a machine is due for inspection. They should especially watch for damage or distress in what are non-wearing parts and parts that are not likely to be readily available from stock. From these inspections and from their knowledge of the machines and their experience they should plan with the purchasing department to have the necessary material on hand when the machine reaches the shop.

In your planning give serious consideration to the matter of modernizing your equipment as you overhaul or rebuild it. Improvements are constantly being made. I don't mean you should buy and install everything that comes along, but you should familiarize yourselves with new designs and seriously consider their value to you. One operator had a very old locomotive that made long hauls. He found that the installation of modern motors in the old locomotives paid for themselves in two years. Another example is the one where modern reels had replaced 15-year-old reels advantageously.

The war behooves everyone to conserve anything he can. We must treat everything a little more kindly and with more respect. You must conserve man power. Don't let mechanics run through your mine fixing this and patching that. Some companies pay a lot of wages just for walking time. Men are scarce. Conserve you machinery. There may not be enough new machinery to go around, and even if there should be, deliveries are long and growing longer. Manufacturers are losing men to the armed forces, too, and besides some portion of their facilities are turning out war materials. Avoid overloading machinery



A well lighted and orderly kept machine shop contributes to low maintenance costs

if it is at all possible. Don't subject your electrical units to poor power if that can be avoided. Recheck your plans and your schedules and your layouts to see whether these conditions exist and can be corrected.

Guard the life of your rubber-covered cables. Heat and oil are very harmful to rubber. Don't let your cables get soaked with oil and dirt. Keep them as cool as possible by having good voltage and by using the proper size cables for the loads they have to carry. Carry spare cables and replace spliced cables so they can be vulcanized. One company has a standing rule that at the end of each shift all spliced cables are replaced with new or vulcanized cables. By studying the reasons for splicing they were able to reduce the number materially.

Don't Be Penny Wise and Pound Foolish Regarding Lubricants

A long, long step in the conservation of machinery is the use of proper lubricants. Each oil company has a suitable type and grade of lubricant for application to mining machinery. A few points regarding lubrication I have picked up are: (1) The highest grade lubricant is cheaper than metal, (2) it is cheaper to use a better grade of lubricant than is necessary than to use a poorer grade than is required. The various parts of the modern machinery may require different types and grades of lubricants in varying quantities. Therefore proper lubrication must be done regularly and understandingly. It is wise to work out a lubrication system, teach it to some one, and then turn the job over to him.

Look at the cans used to store oil and decide if you would be willing to pour your favorite automobile oil from them into your car. If you are not willing to do this, then it is high time something is done for the sake of your mining machinery which in these days is more important machinery than your car.

Many of the component parts of mining equipment today are made of high-grade alloys. As this war continues it is only reasonable to suppose that substitutes for these alloys will have to be made. My advice is take extra precautions to save what you have. The application of thought and care on the part of everyone from general superintendent to apprentice mechanic will do it.

Speaking of substitutes, it may be well to consider this from another angle. There are two parties vitally interested in the low upkeep cost of mining machinery. One, of course, is you. The other is the original manufacturer, who is jealous of the reputation of his product from the viewpoint of performance and cost. If for any reason of price, convenience, or ideas of improved performance you are tempted to make substitutes for the manufacturer's materials, designs, or methods it may be very wise to first take him into your confidence. Talk to him frankly and you will find him an interested listener for he knows that in the past many good ideas have originated at the mines. Remember he has data gathered by many individuals over many years in mines all over the country, and therefore he may possibly save you some trouble if you discuss your problems or complaints with him. He will be glad to go to work on a solution if the fault is his or he will, if you want, try to find the cause of trouble if the fault is yours.

A conveniently arranged storage room for the quality lubricants required for many types of mining equipment used underground and on the surface

At the very beginning of our talk I warned you of a rule-of-thumb method of maintenance. For a number of years I have been visiting mines in Pennsylvania, West Virginia, and Ohio in the interest of maintenance. What I have reported is the outgrowth of my observations and discussions with mechanics and officials. I have tried to give each group represented here some idea of its responsibility in preventive mine maintenance.

It would only be fair for you to say to me, "Suppose we followed your suggestions as you say, are you sure it would pay us?" Since I am not too familiar with the programs and methods followed by the companies represented here, I can't say how much they will pay you, but I am positive they will pay the coal industry as a whole.

I would like to emphasize my belief in the policy of allowing the mechanical force of any mine to have more authority to determine when a machine should or should not work due to its conditions. To many this sounds like heresy, and they look at me almost pityingly as they remind me of the mine law which states the mine foreman has full charge of all personnel and equipment in the mine. Of course he has. But, gentlemen, I never have seen anything in the mine law prohibiting the mine foremen cooperating with the mechanical department—have you?

One high operating official wrote, signed, and sent out this letter:

"It has come to our attention that there have been times when the maintenance department has been criticized for wanting to stop certain equipment to make repairs or tighten up bolts, etc. It should be distinctly understood by all of our supervisory force that when, in the judgment of our mechanics, any of the machinery should be stopped to make repairs that will protect it from further damage, there will be no question raised and that our foremen will cooperate in any way possible. A short delay might mean saving a longer outage later on, or the breaking up of some equipment."

That official knows the mine law, and he isn't asking that it be disregarded, but he is asking for cooperation for he also knows their maintenance is better and he is realizing more than ever that a maintenance department is one of importance and should be recognized as such.

Management must understand the importance of providing spare machinery. That will enable a company to complete and fully carry out a preventive maintenance program and will provide a greater uninterrupted flow of coal vitally needed to win this war.

With the COAL DIVISION

of the AMERICAN MINING CONGRESS

SERVICE HAULAGE TRACKS FOR MOBILE LOADING MACHINES

THE COMMITTEE on Haulage Roads is preparing a report on service haulage tracks for mobile mechanical loaders. The committee is not yet ready to submit recommendations, so the discussion presented here is in the nature of a progress report and to explain that detailed analyses must be made before definite conclusions can be reached.

The following page shows three reports (Mines A, B and C) which illustrate the type of data which is being compiled and studied. However, in presenting these records the committee wishes to emphasize that direct comparisons of track cost figures between different mines seldom show the true relation between the efficiencies of the operations. The amount of material and labor depend upon a number of factors and before examining the operating figures it is advisable to consider how these factors affect the track cost.

Figures 1, 2 and 3 show the haulage required for three typical modifications of room and pillar mining in similar areas of 150 ft. by 100 ft. These sketches are diagrammatic and, for purposes of comparison, it is assumed that all working places are the same width and that similar percentages of coal extraction are made. The track indicated in Figures 2 and 3 does not refer to the installation at any one time but to the haulage needed for the ultimate completion of each panel.

The basic item in the material cost, is the lineal feet of track used to mine a given area and in these sketches it is interesting to note that the plan or arrangement of the rooms and pillars does not determine the amount of track needed. While each of these figures have differences in the number of turns and switches used the (theoretical) lineal feet of track installed for mining the areas would be the same for all three systems.

FIGURE 1: Four room @ 150 ft. require a total of 600 ft. of track.

FIGURE 2: Two room @ 150 ft. plus 12 cross-cuts @ 25 ft. require a total of 600 ft. of track.

FIGURE 3: One room @ 150 ft. plus 6 cross-cuts @ 75 ft. require a total of 600 ft. of track.

As soon as any variances are introduced, the amount of track would change accordingly. If the percentage of coal extraction were lowered but all other factors remained constant, there would be less track required. For example, if Figure 1 left wider pillars unmined, by driving only three rooms in the area, the amount of track would be reduced from 600 to 450 ft. Corresponding adjustments apply to Figures 2 and 3.

If the width of the working places are changed, the trackage would likewise be affected. Again referring to Figure 1, if the rooms were narrowed so that five places would be needed to mine the 100 ft. area (with the original percentage of coal left in the pillars), the track in that case would be increased from 600 ft. to 750 ft. The same is true in Figures 2 and 3.

The amount of material purchased, depends upon the number of active places in a unit panel; concentrated mining and a rapid rate of extraction reduces the amount of track needed. If a loading machine can clean up eight faces in seven hours, and if on-shift shooting and other conditions permit two cuts in a working place per shift, then four places would be sufficient territory for the operation.

The amount of material purchased depends upon the time interval that the track lies idle before recovery and re-use. This is of course self-evident and modern mining operations make it a standard practice to remove the track as soon as a room is completed and to re-lay it immediately.

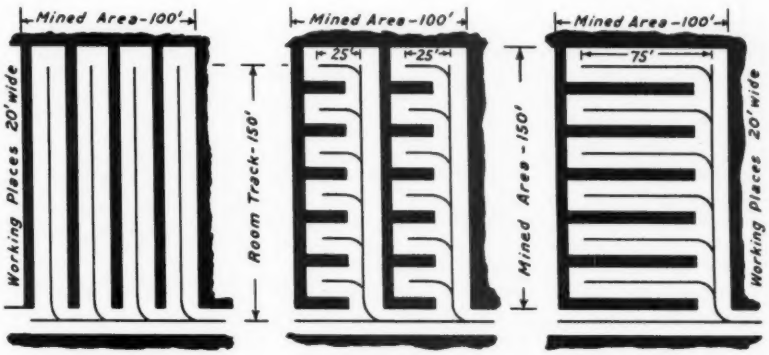


Fig. 1 Room pillars not recovered

Fig. 2 Room pillars recovered

Fig. 3 Block pillar recovery

Diagram Showing Track Required for Various Mining Methods

In examining the reports on Mines A, B, and C the foregoing should be kept in mind, as differences in operating methods and conditions are reflected in the cost of the track work. Before comparisons can be made, some way to equalize these differences must be established and, for example, the committee puts the final figure for the track cost on a "per acre" basis instead of a per ton basis, in order to give a direct comparison between mines in different coal thicknesses. Other adjustments will be made in the completed committee report.

MINE A

TRACK MOUNTED loading and cutting machines are used in entry development and room mining. A panel 600 ft. wide by 1,300 ft. long is developed by a pair of entries and the rooms are mined retreating, off both sides of the entry. Thin pillars left between the rooms are not recovered. A block of 12 rooms is worked as an operating unit and when these are completed, the track is moved to the next block; the sequence of mining is shown on the sketch.

The service haulage is with 8-ton trolley-reel locomotives and 3.3-ton steel mine cars. The entry track has 40-lb. rail 30 ft. long on combination steel-wood ties spaced 20 in. and the rooms have 30-lb. rail 18 ft. long with steel ties spaced 36 in.; full bolted angle bars are used on all track and compromise joints connect the two rail sizes. No. 2½ turnouts are used at the room necks but there are no cross switches in the room break-throughs. The rail lengths are not related to the room centers but are cut underground.

	Material in Use	Original Value	Charged to Unit Panel
Rail	60 tons	$2,800	$370
Compr. joints	24	108	36
Splices	570 prs.	388	75
Track bolts	6.5 kegs	59	46
Steel-wood ties	1,244	1,493	111
Steel ties	1,685	1,395	405
Turnouts	26	912	72
		$7,155	
Material cost—Charged to panel			$1,115
Labor cost—			
Installing	$3,804		
Removing	1,572		
Total labor			$5,376
Total cost—Labor and material			$6,491
Acres of solid coal in panel			18
Track cost per acre of coal			$355

Shown above is the original cost of the track material and the amount charged to a unit panel; this unit panel charge is based on actual supply records which established the number of times that each material was re-used.

MINE B

TRACTOR LOADERS and short wall cutting machines are used in the room and pillar system for entry development, room mining and pillar recovery. A panel 930 ft. long by 610 ft. wide is developed by a four-entry system; these entries are driven to the barrier limit and the panel is then mined retreating. A block of five or six rooms is taken as an operating unit.

The service haulage is with 6-ton trolley-reel locomotives and 5-ton steel mine cars. Track is laid in the two outside entries with connections as shown and switches are laid in the room break-throughs for car changing. The track on the panel entries and rooms is 25-lb. All rails are 30 ft. long with four bolted angle bars or plates, and are cut and curved underground. Wood ties on 18-in. centers are used on the entry; steel ties spaced 3 ft. to 4 ft. in the rooms.

	Material in Use	Original Value	Charged to Unit Panel	
Rail	70 tons	$3,206.00	$160.00	(5%)
Splices	500 prs.	182.50	9.10	(5%)
Track bolts	2½ kegs	28.30	5.66	(20%)
Wood ties	1,460	256.00	128.00	(50%)
Steel ties	1,200	972.00	97.20	(10%)
Spikes	5 kegs	48.10	24.05	(50%)
Turnouts	43	1,090.00	54.50	(5%)
		$5,782.90		
Material cost—Charged to panel			$478.51	(8%)
Labor cost—Installing and removing			4,022.88	
Total track cost in panel—Labor and material			$4,511.39	
Acres of solid coal in panel			15.3	
Track cost per acre of coal			294.80	

The track material charged to a panel is based on the depreciation rates for each class of material as shown in table above; the labor cost includes installation and removal but these two items are not kept separate.

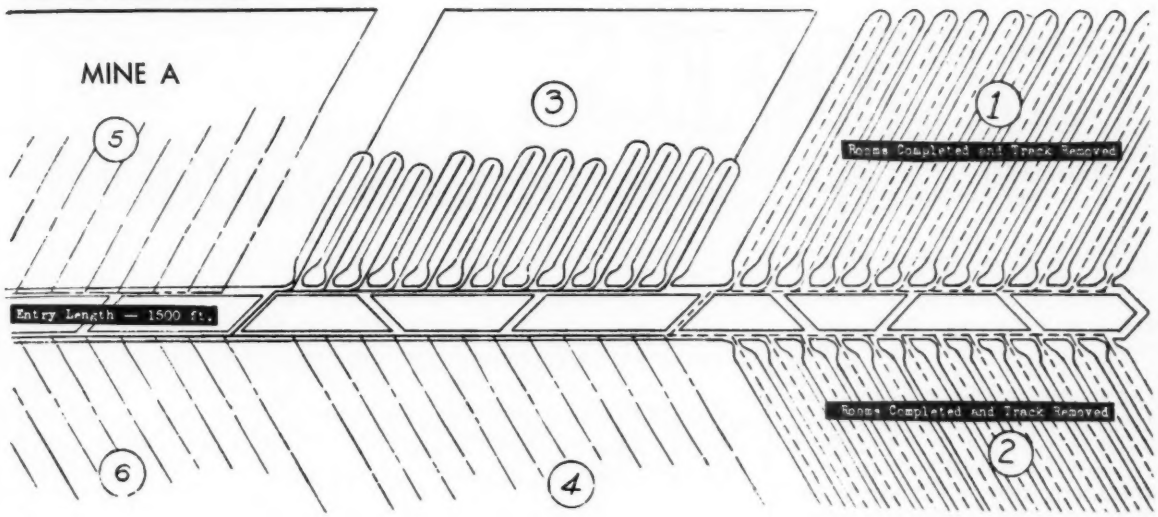
MINE C

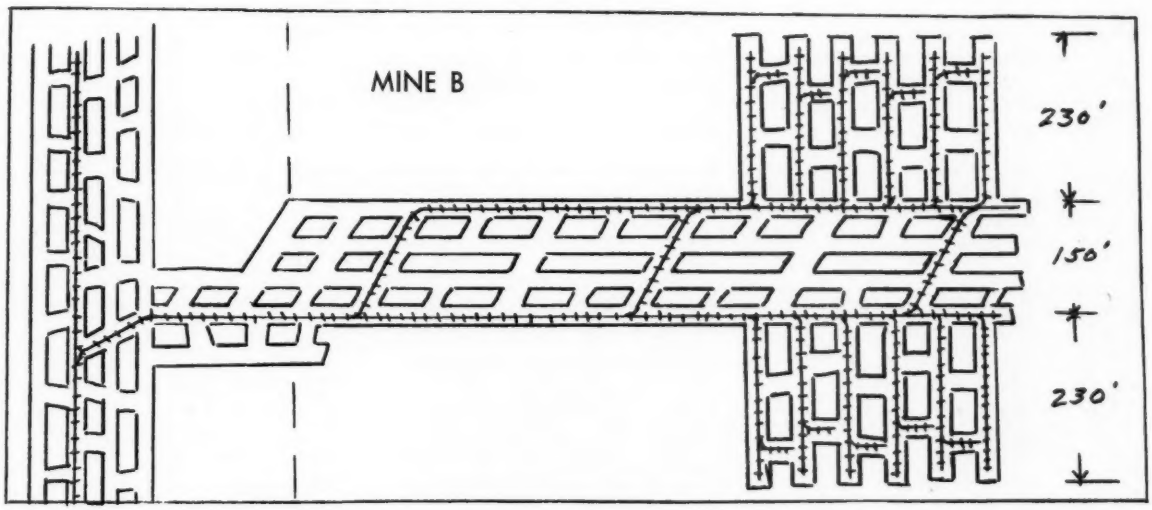
TRACTOR LOADING machines and track-mounted cutting machines are used for the block system in which blocks of coal 65 ft. by 90 ft. are developed by narrow rooms and break-throughs, and recovered by open end cross-cuts.

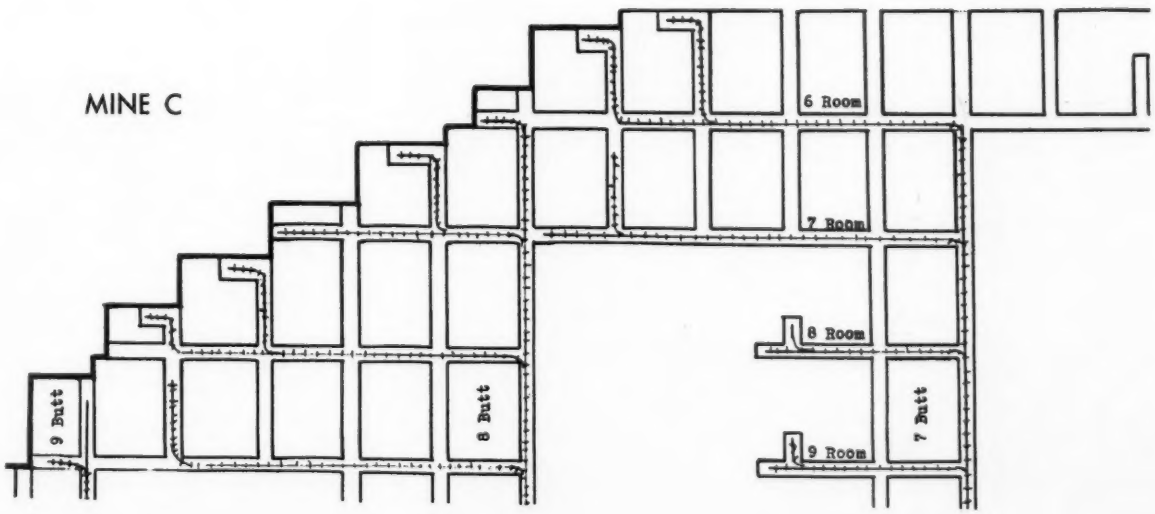
The service haulage is with 8-ton trolley-reel locomotives and 4.25-ton mine cars. All track in the entries and rooms is of 40-lb. rail; wood ties are used in the entries and steel ties on 18-in. centers in the room and pillar work. Four bolted standard fish plates are used throughout. The steel rails are in 20-ft. and 10-ft. lengths; places are turned on exact centers so that no rail cutting is done underground. All curved rails are prebent and preformed knock-down switches are used for the turnouts.

The track material charged to a unit panel is shown in table above is based on an overall depreciation of 25 percent per year; a panel is mined out in 5.6 months so that the cost of the track material in a panel is taken as one-half the annual depreciation rate, or 12½ percent of the original value.

	Material in Use	Original Value	Charged to Unit Panel	
Rail	62 tons	$2,790.00	$348.75	(12½%)
Splices	518 prs.	398.86	49.86	(%)
Track bolts	15 kegs	198.75	24.84	(%)
Wood ties	1,400	420.00	52.50	(%)
Steel ties	2,050	1,537.50	192.19	(%)
Spikes	18 kegs	78.48	9.81	(%)
Turnouts	30	2,250.00	281.25	(%)
		$7,673.59		
Material cost—Charged to panel			$959.20	(12½%)
Labor cost—				
Installing	$3,445.60			
Removing	$1,832.00			
Total			$5,277.60	
Total cost—Labor and material			$6,236.80	
Acres of solid coal in panel			19.3	
Track cost per acre of coal			323.15	


MINE A
5
3
1
Rooms Completed and Track Removed
Entry Length — 1500 ft.
Rooms Completed and Track Removed
6
4
2


MINE B
230'
150'
230'


MINE C
6 Room
7 Room
8 Room
9 Room
9 Butt
8 Butt
7 Butt

WHEELS of Government

● *As Viewed by A. W. Dickinson of the American Mining Congress*

Washington Highlights

WAR FRONT: Situation stirring on all fronts.
UNCLE SAM: He's getting tough.
REVENUE BILL: After election you'll find out.
DEPLETION PROVISION: Mining industry vindicated.
STRATEGIC MINERALS: Need tax relief.
MANPOWER: Mines must have more men.
GOLD MINES: Senator McCarran tells their story.
WAR LABOR BOARD: Considers mine wages.
PAUL McNUTT: Appeals to miners "STAY ON YOUR JOB."

AS THE tidings of war bring a measure of encouragement following successes of the United Nations' strategy in Europe, Asia and the South Pacific, attention also centers upon our problems of supply which bear directly upon the ability of our far flung forces to carry on to ultimate victory.

Our government must deal effectively, and soon, with questions of manpower, labor contentions, essential war materials production, prices and taxes, and with the dove-tailing effect of all of these factors each upon the other. The nation's manpower for the Army, Navy and the war industries must be apportioned to the needed balance; stoppages in production by labor controversies have no place in the present emergency; allocation of materials and stimulation of production must be ironed out; we are compelled to fit prices to national needs; and in the composite program the enactment of tax laws must be so guided that essential production of vital materials will not be crippled.

There is encouragement in the strong indication that our war executives and legislative leaders are becoming alive to the compelling necessity for such a coordinated program.

Writing the Revenue Bill

Recessing for a week after the close of hearings on August 14 the Senate Committee on Finance began consideration of the Revenue Bill of 1942 in executive session on August 24. Hope for early enactment in order to take advantage of the excise tax revenues is fading and mid-November may arrive before the measure becomes law.

Thus far the committee has removed the House-approved 5 percent excise tax on freight by a vote of 13 to 4 and has acted on the following items: income from future issues of state and municipal securities made subject to tax; reduced credit for dependents from $400 to $300; approved 5 percent withholding tax in 1943, increasing to 10 percent in 1944 including the use of the Gretz "wage band" tables setting forth the amount of deduction by $5 wage groups for single persons, for working married couples, for married families in which one spouse works, and for heads of families; exempted bond and coupon interest from withholding tax deductions; authorized corporations to purchase their own securities below par, free of tax; repealed capital stock tax and declared value excess profits tax; under average earnings credit from excess profits tax, authorized corporations to substitute 75 percent of the average earnings in the three best years, for the year of lowest earning.

Rejecting the Treasury's proposal of a 55 percent combined normal and surtax rate coupled with a 90 percent excess profits tax, the Finance Committee on August 31 approved a 45 percent normal and surtax levy with a 90 percent excess profits tax, together with a 10 percent post-war credit to be allowed against surtaxes and excess profits tax in non-negotiable, non-interest-bearing bonds redeemable starting two years after the war. The committee accepted the Treasury's proposal for a corporate tax credit for debts ranging up to 40 percent of a corporation's repayment on debts incurred previous to January, 1942, such credit to be charged against the post-war credit otherwise allowable. Another amendment placed a ceiling on total corporation tax payments at 80 percent of net income. Specific exemption for excess profits tax purposes was reestablished at $5,000 reducing the $10,000 exemption allowed in the House bill. A loss "carry-back" and unused excess profits tax credit placed in the bill would permit a 1943 "carry-back" to apply only against 1942 income, but in 1944 and thereafter losses may be carried back two years.

The committee, on September 1, voted 14 to 6 to continue the depletion provisions of the House bill including the amendment by Representative Wesley Disney of Oklahoma, which, in effect, provides an annual election of either percentage or cost depletion. Discussions with Treasury representatives are continuing on relief provisions affecting mining enterprises and there is a possibility that the strategic metal exemption from excess profits tax may be restored and that something constructive will be done on the Johnson amendment providing for a unit of production credit.

On August 6 American Mining Congress witnesses placed the position of the mining industry before the committee, emphasizing particularly the need for maintaining a sound industrial system throughout what may be a long war. AMC Tax Committee Chairman Henry B. Fernald urged that the Johnson amendment be enacted;

that the strategic metals exemption be restored, and that new mining enterprises of short or uncertain life be permitted to recover their capital before there is any computation of taxable profit. Mr. Fernald also spoke on the excise tax on freight, collection of tax at source, invested capital credit, income credit, provision for savings, capital stock tax and declared value excess profits tax, and consolidated returns, as well as a number of technical amendments and special relief matters. M. D. Harbaugh, vice president of the Lake Superior Iron Ore Association made a strong plea for the Johnson amendment.

Committee hearings on August 10 were devoted chiefly to the Treasury's attack on the percentage depletion deduction. Oil and gas witnesses were followed by Donald A. Callahan, vice president of the American Mining Congress; Rolla D. Campbell, speaking for coal members of the Mining Congress and William C. Broadgate representing the Arizona Small Mine Operators Association.

Senator Pat McCarran of Nevada, who recently concluded the Senate Silver Committee tax hearings in Reno, Salt Lake City and Denver, told the committee on August 13 that the present tax structure is retarding production of needed minerals. The Senator explained that venture capital cannot be expected to undertake new developments when the government takes 90 percent of the possible proceeds in taxes. He made a strong plea for the restoration of the excess profits tax exemption for strategic metals and urged that mines of short or uncertain life be permitted to recover their investment before any federal taxes are assessed.

Dr. Wilbur A. Nelson of the War Production Board appeared immediately following Senator McCarran and stated to the committee that the board "is anxious that nothing be done which will interfere with the production of minerals essential to the war program."

Despite the desire of Chairman George to secure early enactment of the bill, everyone realizes that the committee has a real job on its hands. Hope for early enactment in order to take advantage of the excise tax revenues is fading and mid-November may arrive before the measure becomes law.

Manpower Problem

No information has been made public on the legislation which is being drafted by the War Manpower Commission at the reported request of the White House. Among provisions which it is believed such a measure would contain, is the use of compulsion to transfer and place men in essential war industries, and the registration and utilization of women in war work. In the meantime, Lieut. Gen. Brehon B. Somervell, chief of the Army Services of Supply, who is reported to be convinced that shortages of the non-ferrous metals are very serious, has proposed the recruiting of mine labor for the copper and other mines from fields in which it has been said that no labor shortage exists.

Publicity has been given to suggestions that gold mines be shut down for the duration of the war, and in response to an inquiry by Senator Pat McCarran of Nevada, the California gold producers have made a survey which shows that with nine large gold mines already shut down, due largely to shortage of labor, there are only 669 miners remaining in the balance of 13 operating mines. Most of the younger men have now gone to the armed services, shipyards and airplane plants and the average age of those employed is approximately 45 years. It is stated by their employers who know them best that, in the event the mines were shut down, very few if any of the men would seek employment in the copper and other base-metal mines.

War Labor Board Hears from the Mining Industry

War Labor Board hearings, now in their fourth week, involving several thousand workers in 37 mines, mills and smelters, are expected to continue until mid-September. It is rumored that the Board may consider these cases as a unit and make a covering decision embodying a general wage adjustment for non-ferrous metal mining. White House consideration of wage stabilization moves is seen in the activity of Judge Samuel I. Rosenman of New York, who is preparing cost-of-living data for the President, and who is reported to have said that wage stabilization is necessary, per-

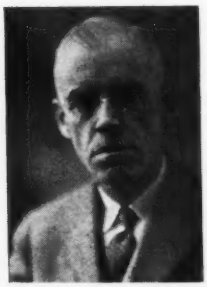
(*Continued on page* 61)

A part of the waiting room at the airport near the National Capital. The tall windows allow visitors ample vision of the arrival and departure of passenger planes.

PERSONALS

Harry M. Moses, president of the H. C. Frick Coke & Associated Companies, announced recently the election of **G. W. Sweeney** as vice president finance and comptroller of these U. S. Steel subsidiaries.

C. K. Leith, now acting as consultant to the Materials Division of the War Production Board, has been elected to honorary membership in the Institution of Mining and Metallurgy, of London, in recognition of his work on the economics of mining and his contributions to the study of geology.



John G. Barry has been named head of a permanent field staff of the Metals and Minerals Division of BEW, with offices in Mexico City.

S. F. Shaw, consulting engineer of San Antonio, Tex., is examining fluorspar and tungsten properties in Colorado and mica properties in New Mexico.

Edgar Weichel, of the Hudson Coal Co., Scranton, and **George Roos,** general manager of the Philadelphia & Reading Coal & Iron Co., Pottsville, have been appointed to the Anthracite Inspectors Examining Board by Governor James, of Pennsylvania.

H. R. Robbins, formerly special foreign representative for the American Cyanamid Co. in the Far East and Australasia and more recently consulting metallurgical engineer for the Oriental Consolidated Mining Co. in Korea, is now engineer with the Reconstruction Finance Corporation in charge of the Metals Reserve Co. chrome and manganese ore purchase depot at Auburn, Calif.

S. F. Kelly has been conducting geophysical work on graphite deposits in Pennsylvania and iron deposits in New Jersey.

W. A. Wasley has recently become associated with the Compania Minera Santa Maria del Oro, S. A., Santa Maria del Oro, Durango.

Howard I. Young, president, American Zinc, Lead and Smelting Company, has announced that **George W. Roddewig** has joined the staff of the company and its subsidiaries as consulting engineer. His office will be located at 16th Floor, Paul Brown Building, St. Louis, Mo.

Republic Coal & Coke Co., with headquarters in Chicago, is opening a district sales office in the Union Trust Building, Cincinnati. **Ray T. Patton** has been appointed district manager.

Charles F. Jackson, chief of the Mining Division of the U. S. Bureau of Mines, recently tendered his resignation. Mr. Jackson has returned from a satisfactory fishing trip to his home, 6802 Brookville Road, Chevy Chase, Md.

Blair Burwell, manager of western operations for the U. S. Vanadium Corp., has been investigating tungsten claims near Tonopah, Nev.

Paul M. Price, until recently engineer at the Bonanza Mines, Jensen, Utah, is now connected with the Vanadium Corp. of America at its tungsten mines in Boulder County, Colo.

John L. Dewey has resigned as chief chemist of the Howe Sound Co. to accept an appointment as assistant metallurgist for the U. S. Bureau of Mines in Salt Lake City.

J. C. Kieffer, formerly with Tri-State Zinc, Inc., Picher, Okla., has accepted a position with the Callahan Zinc-Lead Co., Cascade, Idaho.

Dr. Wilbur A. Nelson has been temporarily assigned as Special Assistant to Mr. A. I. Henderson to deal with mining, mill and smelter production and related problems. During Mr. Nelson's leave Dr. Marcellus H. Stow will be Acting Chief of the Mining Branch and will be in charge of handling priority matters for mines and manufacturers of mining machinery. Dr. Nelson's office will remain in the same location, Room 1035, in Temporary Building "R." It is understood that he will be consulted as to various questions of production, prices, manpower, mine taxation, etc., which affect the supply of mineral products required in the war program.

Harry F. Nash has been promoted to the office of president and general manager of the Leyden Lignite Co., Denver, Colo. Mr. Nash had been vice president and general manager. Other officers are: Vice president, **Donald B. Robertson;** secretary-treasurer, **W. A. Alexander;** mine superintendent, **C. E. Dollar;** mine foreman, **John Page;** chief electrician, **John Detlefsen;** in charge of mechanical loading, **Elwin Hedden.**

Paul R. Maxey, previously general foreman for the American Rolling Mills Co., has been appointed chief engineer at the company's Nellis mine, Nellis, W. Va.

Simon H. Ash has been named chief of the Metal and Non-Metallic Mineral Section of the Bureau's Emergency Wartime Mineral Production Security Division. Mr. Ash was former district engineer in the Pacific Coast region and for the last two and one-half years district engineer in the eastern Pennsylvania region and adjoining states.

Robert L. Lindsay has been appointed superintendent by the Dering Coal Co., Eldorado, Ill. He was formerly mining engineer for the same company.

Clifton W. Livingston, formerly instructor in mining at Michigan College of Mining and Technology, is now associated with the Calumet & Hecla Consolidated Copper Co. in Calumet, Mich.

B. L. Lubelsky, formerly engineering manager for Powhatan Mining Co., Powhatan Point, Ohio, has been commissioned lieutenant commander in the U. S. Naval Reserve, Ordnance Department, and at present is stationed at West Hanover, Mass. Mr. Lubelsky is well known throughout the bituminous and anthracite fields, where he has served for a number of years as mining engineer and is recognized as an authority on the use of explosives.

W. D. McMillan, of Rolla, who has been assigned as district engineer of the U. S. Bureau of Mines in the Tri-State mining field, arrived in Joplin the middle of July to take up his assignment. He will be under the direction of **Eugene D. Gardner.**

Robert D. MacDonald has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he has been assigned to the materials beneficiation division. Prior to joining the Battelle staff he was associated with the General Engineering Co., Salt Lake City, Utah.

William P. Young, vice president and general manager, Bell & Zoller Coal & Mining Co., has been elected president, succeeding G. Donald Cowin, deceased. He has been with the company a number of years. Other personnel changes include **David H. McMaster**, who has been advanced from executive vice president to president of the sales organization; **Homer F. McDonald** has been made vice president; and **E. L. Carr**, assistant to the president.

Wm. P. Young

Robert S. Moehlman, of the Anaconda geological staff, formerly stationed at Butte, has established an office in Reno and is supervising prospect drilling on Nevada copper properties held under option by International Smelting & Refining Co., a subsidiary of Anaconda.

Richard Vail is in Washington. After making various field trips for one of the Materials Divisions of WPB, he has been assigned to the Board of Economic Warfare, where he will be engaged in the Non-Metallic Minerals Section of the Metals and Minerals Division, of which **Paul M. Tyler** is chief.

Lloyd Anderson, who was at Peabody Mine No. 43, Harrisburg, Ill., until it was abandoned, and later at Mine No. 47, Harco, has been appointed superintendent at Mine No. 24, Danville, Ill.

F. McIntosh Galbraith has resigned as geologist for Falconbridge Nickel Mines, Ltd., Falconbridge, Ontario, and has become associated with the Day interests at Wallace, Idaho.

Theodore A. Dodge, of Las Cruces, N. Mex., has joined the geological department of the Cananea Consolidated Copper Co. in Cananea, Sonora, Mexico.

W. J. Bailey has been appointed superintendent of the Sayre mine, Republic Steel Corporation, Sayre, Ala. He had been connected with the Sayreton mine operations as mine foreman for several years.

Oliver Hall, consulting engineer for Noranda Mines, has been elected president of the Ontario Mining Association. **Robert E. Dye**, assistant manager of Dome Mines, is second vice president.

A. B. Young has been appointed metallurgical manager of the International Smelting & Refining Co. in charge of all metallurgical operations of the company and its subsidiaries.

Frank C. Lathrop, of San Francisco, Calif., retired veteran west coast railroad official, has accepted appointment as a member of the Solid Fuels Advisory War Council. Mr. Lathrop will be one of the two representatives of the general public on the war council and fills the vacancy created by the resignation earlier this year of Louis J. Brann, of Lewiston, Me., former Governor of Maine. The other public representative on the council is Dr. Walter Dill Scott, of Evanston, Ill., president emeritus of Northwestern University, who is chairman of the council.

Besides the two men representing the general public, the council includes representatives of coal producers, transporters, and distributors as well as mine labor. It meets periodically to advise Coordinator Harold L. Ickes on fuel problems in relation to the war.

William Newman has been appointed chief of the ad valorem tax department of the Oliver Iron Mining Co., Duluth, Minn. He was formerly connected with the St. Louis County Board of Commissioners.

A district office of the U. S. Bureau of Mines has been established at 806 Failing Bldg., Portland, Ore. **Henry Iverson** is in charge.

Harry Bradbury recently resigned as a Federal coal mine inspector to become general superintendent for the Moffat Coal Co., Sparta, Ill.

O. B. Clark has been named manager of mines of the West Virginia Coal & Coke Corporation, Omar, W. Va.

A. A. Bakewell, Jr., has resigned from the Standard Cyaniding Co. at Lovelock, Nev., to become associated with the Nevada Consolidated Copper Co. at Ely, Nev.

Vincent N. Burnhart resigned recently as field engineer for the American Metal Co. and is temporarily at home in Denver, awaiting his call into the Army.

Col. John Stilwell, president of the National Safety Council, has announced the appointment of **Ned H. Dearborn**, of New York City, as executive vice president and managing director of the Council. He succeeds **W. H. Cameron**, who is retiring after almost 30 years as managing director. Since 1934 Mr. Dearborn has been dean of the division of general education of New York University. In his new position he will actively direct the greatly expanded war-time program now being conducted by the National Safety Council as a result of a proclamation by President Roosevelt.

— *Obituaries* —

The coal mining industry mourns the loss of **Sydney Arthur Hale**, editor of *Coal Age*, who died August 12 in his home at 59 Fairview Avenue, Tarrytown, after an illness of eight months. He was 54 years old.

Mr. Hale joined the staff of the McGraw-Hill Publishing Company in 1925 as associate editor of *Coal Age* and became editor in 1928. He was credited with having influenced the progress of the coal industry, particularly in regard to mechanization and research. He received an award for the best editorial, "No More Panaceas," in the business and technical press in 1926 from the Associated Business Papers, Inc.

During 1913 he engaged in the printing business in Chicago, forming the Hale-Crossley Printing Company. The following year he became western representative for editorial and business departments of the *Coal Trade Journal* in Chicago. He was made editor in 1918 and continued in this capacity until 1924.

He was also market investigator for the United States Coal Commission and was co-author with the late F. G. Tryon of the United States Geological Survey on Coal Reports for 1919-22. Mr. Hale was a member of the Lotos Club, the Union League Club of Chicago and the American Institute of Mining and Metallurgical Engineers. His wife, Laura M. Hale, died August 29, 1941. The couple had no children.

Charles Beaton Duckworth, 64, of Magna, Utah, retired employe of the Utah Copper Co., died on June 19. Mr. Duckworth had been master mechanic for the company for 32 years.

Hugh Rice, 53, vice president of the Phelps Dodge Refining Corp. and native of Benton County, Ark., died on August 6, 1942, in New York City.

John T. Joyce, long identified with mining in Colorado, and at one time state mining commissioner, died recently at the age of 88.

William Reid, 78, died on July 20 at Salt Lake City, Utah. He was former assistant manager of the American Smelting & Refining Co.

David R. Warden, 44, died suddenly at his home in Bluefield, W. Va., on Thursday, August 22. Death was due to a heart ailment. Mr. Warden was southern sales manager for the William C. Atwater & Co. and has been very active in civic work of the community.

Harry J. Leschen, president of the A. Leschen & Sons Rope Co., died suddenly Sunday, August 2, at House Springs, Mo. Mr. Leschen, who was 63, became associated with A. Leschen & Sons Co. in 1897 and was named president in 1914, succeeding his father. The company was formed here by Mr. Leschen's grandfather, Adolph Leschen, in 1853, and was regarded as one of the largest of its kind, with branches in New York, Chicago, Denver, and San Francisco.

He was president of the National Wire Rope & Strand Manufacturers' Association between 1933 and 1941, but had not been active in this organization the past year.

NEWS and VIEWS

Don't Scrap Used Mining Equipment

Secretary of the Interior Harold L. Ickes announced recently that he had instructed all field engineers of the Bureau of Mines to prevent, if possible, the scrapping of usable second-hand mining equipment in the current salvage drive.

Reports have reached his office, he said, that valuable and non-replaceable mining machinery in workable or repairable condition was being picked up and destroyed for scrap in the salvage drive. In addition, the reports indicated, ore reduction and treatment machinery, such as kiln equipment, crushers, ball mills, etc., are being scrapped.

"Every piece of usable or repairable mining equipment is absolutely vital," Secretary Ickes said, "because it cannot be replaced. It would be a grave mistake to take this class of material for destruction for scrap."

He took the matter up with Donald Nelson, chairman of the War Production Board, who agreed to instruct salvage campaign officials in the field not to pick up mining machinery unless its release was approved by Bureau of Mines engineers.

West Virginia University To Dedicate New Mineral Industries Building

As a fitting tribute to the opening of the institution's seventy-sixth academic year, West Virginia University on October 16 and 17 will dedicate its new million-dollar Mineral Industries Building, called by competent authorities the finest structure of its nature in the United States.

An appropriate as well as essential addition to the State University's campus in view of West Virginia's vast coal, oil and gas, chemical, and ceramic industries, completion of the building is especially timely because of the vital role the state is playing at the present time in the nation's war effort.

Begun in 1940 after years of careful planning, the building embodies factors which make it the fulfillment of the dreams of the scientist, engineer, teacher, and student. Now fully completed and equipped, it houses the School of Mines, the West Virginia Geological Survey, the Department of Geology, and the Department of Chemical, Metallurgical, and Ceramic Engineering.

Dr. Friend E. Clark, chairman of the University Graduate Council and head of the Department of Chemistry, in his capacity as chairman of the dedication committee has announced a tentative two-day program which calls for the appearance of speakers of national and state-wide reputation, including Governor M. M. Neely and President Charles E. Lawall of the University.

The dedication, which is expected to attract specialists in the fields involved from throughout the United States, will be held October 16 at 2 p. m. Following registration, the morning of that day will be devoted to an inspection of the building. The evening and all of the next day will be given over to various scientific and industrial groups which have scheduled their annual meetings for this occasion.

Other members of the dedication committee are Dr. Paul H. Price, state geologist and head of the Department of Geology, Prof. W. W. Hodge, head of the Department of Chemical, Metallurgical and Ceramic Engineering, and Prof. W. A. Staab of the School of Mines faculty, who has been acting in the absence of the mines director, D. L. McElroy, now in Washington as a technical adviser for the mining branch of the OPM.

Arizona Group of Claims Reported Sold

Sale of the Mystery and Courtland mining groups of the Gleason-Courtland district in Arizona under an option of $60,000 is reported from records of the Pinal County recorder's office. Mrs. Ruth Armstrong, Phoenix, is reported to be the prospective buyer. The mines are owned jointly by Mrs. Nancy E. Warnekros, formerly of Tombstone, and Roy H. Barnes, Douglas. The Mystery group comprised eight patented claims, the Courtland, four. Some of the colorful names given the claims are Last Chance, Queen of the Hills, Bull Run, Cyclone, and Poor Man.

Voluntary Labor-Management Committee At Inspiration

The Inspiration Consolidated Copper Company of Inspiration, Arizona, has been added to the list of more than 1,100 plants in the nation recognized by the war production drive headquarters in Washington, D. C., as having voluntary labor-management committees working to increase war production.

D. F. DAVIS, SALT LAKE CITY

Considered to be the thickest seam of bituminous coal in the country, the "D" seam of the Utah Fuel Company's great Castle Gate mine in Utah measures at this point 30 to 34 ft. thick

Relief To Coal Mines

Asking to meet special conditions which have resulted in increases of production cost to certain coal mining operations in the state of Washington, the Office of Price Administration has modified the established maximum prices of coal. According to Price Administrator Leon Henderson, the relief was granted because it was clearly shown that costs have been increased due to a variety of factors including shortages of labor and a shift to new seams of coal. He gave the further explanation that the production of these mines is extremely important because of the large demand for coal from war industries in the northwest. The Price Administrator stated that curtailment of production of these mines would probably result if relief were not granted and would compel the shipping in of coal from out of state sources, thereby placing a greater strain on the transportation system. The properties involved are those of the Black Norman Mine of the Pacific Coast Coal Company, the Newcastle Mine of the Strain Coal Company, the Cedar Mountain Mine of the Consolidated Mines, Inc., and the McKay Mine of the Dale Coal Company.

The Bituminous Coal Division is also reported to have submitted recommendations for increases in bituminous coal prices of from 15 to 30 cents per ton averaging 15 cents a ton over the country. By areas the price increases are 20 cents east of Michigan and Indiana to the Atlantic seaboard as far south as Georgia; 10 cents in Chicago, northwestern Indiana and Louisville; 15 cents in Wisconsin, upper Michigan, North Dakota, South Dakota except Black Hills region, and Montana; 5 cents in west and south central Indiana, Illinois except Chicago, Iowa, Missouri, western Kentucky and Tennessee, Mississippi, Arkansas and Louisiana; 30 cents in Alabama, west central Georgia and northwest Florida; 5 cents in Wyoming, Utah, Idaho, Oregon, Nevada, California and South Dakota Black Hills; 10 cents in Nebraska, Kansas, Oklahoma and east Texas; 30 cents in Colorado, Arizona, New Mexico and central and west Texas; 25 cents in Washington, Alaska and western Canada.

Alaska Mines Maintaining Some Production

Mining operators in Alaska are operating on a partial basis this year under great difficulty. There is hardly a camp in the territory that is not handicapped by lack of men. Many camps, ordinarily working two and three shifts, are now only working one. Operators feel they will be fortunate if they are able to complete the season.

There are only a few mines working in the Seward Peninsula area. These include the property of Castleton and Keenan, the Lee Brothers Dredging Company, the Council Dredging Company, and a few others. Among these are the Arctic Circle Exploration Company at Candle whose dredge was destroyed recently by fire. Nels Viebe who operated a dredge at Ophir was also burned out this year before his operations had reached capacity.

Dredge and dragline camps on the Kuskokwim River handicapped by lack of supplies and shortages of men have also been hard put to operate this year. The New York Alaska Gold Dredging Company at Nyac, Ostness and Johnston at Fortuna Ledge, and Sid Paulson at Folger are some of the camps operating in this area. Farther up the Kuskokwin is the Bristol Bay Mining Company at Sleitmute, Gus Uotila and Eric Hard, Hugh Mathieson, Rosander and Degnan, and a few others all operating on a reduced basis.

In the Fairbanks area the United States Smelting Company is operating all of its camps with a reduced crew. Other mines in the Fairbanks vicinity have had a nip and tuck battle to keep going. The Long Creek Mining Company and the Gaines Creek Dredging Company near Takotna are also operating this year.

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2—Drills up to 6″ holes, for shooting shales, sandstone and hard pan formations.
3—Easily moved from one hole to another.
4—Is equipped with a 20 h.p. Wisconsin motor and a single speed reduction.
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6—Sold on a performance guarantee.

PARIS Manufacturing Co. Inc.

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Submit us your drilling problems for further information.

Company is operating its dredge, the North American Dredging Company, Moore Creek Mining Company, Awe and Company, and Savage and Bergstrom are operating also.

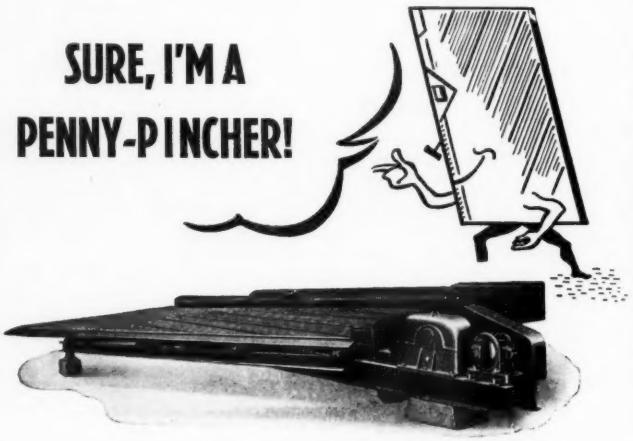
Most of the hard rock mines in Alaska have ceased operations for the duration. About the only mines of this type now working in Alaska are the Alaska Pacific Consolidated and the Gold Cord Development Company at Wasilla, the Alaska Juneau Gold Mining Company, and the Cleary Hill Mines of the Fairbanks area. This company has taken over a sheelite property formerly worked by Mike Stepovich during the last world war. Ralph Wyer, general manager for Cleary Hill, has great hopes for this property and anticipates quantity production of sheelite concentrates. Nearly all of the hard rock mines are operating with half or less of their crews. About the only placer camp going along normally is the Goodnews Bay Mining Company.

Large Dumps To Be Treated By Sink and Float Process

Another large eastern mining organization is entering the Leadville district and will erect a large sink and float mill to treat ores. After preliminary negotiations and investigations which the Ore & Chemical Corp., of New York conducted the latter part of last year, a contract between the corporation and the Rock Hill Mines Co. of Leadville has been concluded.

The corporation has leased the four dumps with a view to treating the ore to recover zinc, lead and silver contents. Kurt A. Spohr is the company's manager in Colorado. The South Moyer dump was thoroughly sampled by H. W. C. Prommel, prominent mining engineer of Denver. Sampling by sinking test pits was begun early in May and was recently concluded. Large scale milling tests were subsequently conducted by the Bureau of Mines, Denver Equipment Co., American Cyanamid and Sink & Float Corp., at their Burke, Idaho, pilot plants.

SURE, I'M A PENNY-PINCHER!



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A clean-cut line of separation is a true indication of efficient washing . . . and your best sign of profitable operation.

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For complete information on the SuperDuty No. 7 Diagonal Deck Coal Washing Table, write for Bulletin No. 119.

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CONCENCO PRODUCTS

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Manpower

(*Continued from page* 22)

period. In order to take an appeal the employer simply has to sign his name to Form 59 which he has received, and return it to the local board; or in case the Form 59 is not received from the local board, any written request will have full value to make such an appeal effective. When Form 59 is returned by the employer the appeal procedure becomes automatic. All necessary forms are available at the local board in the employer's immediate vicinity or at the office of the State Director of Selective Service.

If the local board and the appeal board deny the appeal for the occupational deferment of a key man, the employer may then bring the matter to the attention of the State Director at the State Selective Service Headquarters, with the request that the case be reopened or appealed by him to the President.

A double duty rests upon the employer. He should personally know what his manpower situation is. He should not leave the job to a minor employe to decide who is necessary. The employer who delegates the task of filing a request for deferment to a clerk, the executive who does not make a complete inventory of his whole plant today, is negligent. Likewise, the employer who files requests for deferment of men who can be replaced by women, or others, is keeping reinforcements out of an army which is battling for us all. The employer engaged in essential war production who has been required to greatly expand his plant and who then fails to request deferment for his key men is also negligent.

A good rule to follow: Don't ask deferments for any men who can be replaced by training another individual not likely to be eligible soon for service in the armed forces.

Make an inventory, request deferment for any man whose immediate going into the armed services would retard production of vital war material or other services essential to the war effort, or who is needed to maintain national health, safety and interest. Only when an employe is working in a critical occupation within an essential industry should a Form 42A be filed for his temporary occupational deferment.

Make Replacements

Yes, an inventory within a man's own plant is called for; also an appraisal and analysis of the manpower in the community. There is many a man over 45, or a man physically handicapped, or a woman who can do that job that the 23-year-old boy is doing who took a 12-weeks course at a learn-quick school.

There are not more than 60 million people in this country who are capable of effective productive effort. These men and women represent our total manpower available to win the war. They must do everything that must be done in a total war; maintain transportation, communications and utility systems, maintain public services, grow food for ourselves and our allies, mine the metals and produce the raw materials, fabricate and produce the amount of consumers goods necessary to maintain even a restricted national life and the supplies, weapons and munitions of war; also most of all they must provide the men who land on strange shores in far places, the men who carry the fight to the enemy on a multitude of far-flung frontiers. The rest of the population who mine raw materials and produce the weapons with which these men fight must be a self-disciplined team working in unity. The individual personal convenience, comfort or pleasure, or the convenience and ordinary leisurely replacement programs of the employer, will have to be given progressively less consideration as the war gets tougher and the casualty lists grow.

When we hear of the big armies we are going to raise, we must all remember that it takes at least five men or women to produce what they eat, use, fight with, and wear. With less than 60 million availables in this country, those figures are worth deep consideration.

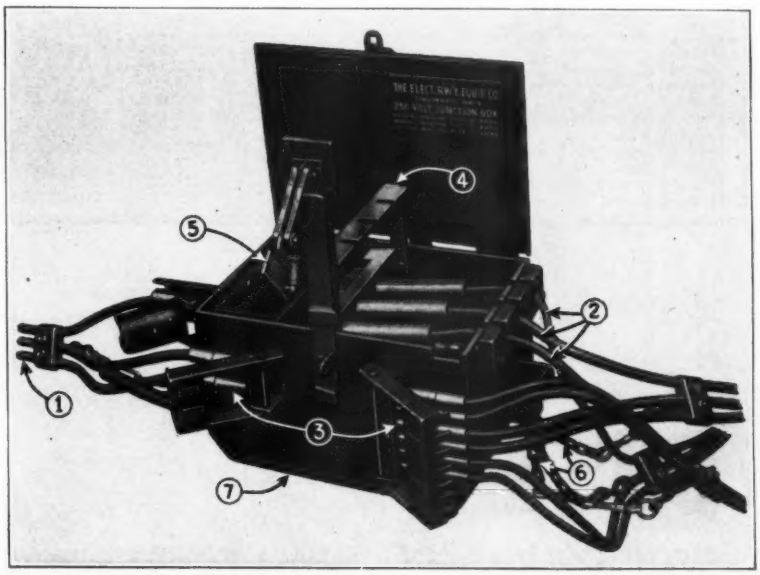
Copper Properties To Be Surveyed and Studied

A survey of copper properties in the Twin Buttes area southwest of Tucson, Ariz., has been started by the U. S. Bureau of Mines, and it is expected that the survey will lead to further explorations by the bureau. Also a detailed geologic map will be made in cooperation with the U. S. Geological Survey. At Twin Buttes the survey party will map the old mine workings and surface claims held by the Twin Buttes company. Two of the claims are owned by William Foy.

Stripping Program Under Way Soon

Stripping of iron ore deposits covering a block of approximately 1,600 acres near Jacksonville, Texas, will be started soon by the Sheffield Steel Co. which is constructing a blast furnace and steel plant on the Houston ship channel.

The Missouri-Pacific Railroad will build a spur track to the deposit. The ore will be crushed and washed and then shipped to blast furnace. Engineers estimate that the 1,600 acres contain between 2,000,000 and 3,000,000 tons of iron ore.



PAT. APPLIED FOR

The ELRECO No. 1228 JUNCTION BOX for D.C. circuits is the essential safety link between the power source and the coal mining equipment.

7 Features Guarantee Safe and Efficient Service

No. 1. 3-Wire incoming power circuit cables (Pos., Neg. & Safety Ground). Safety chain and clamp relieves all strain on cable terminals.

No. 2. Out-going positive cables for machine, loader and drill circuits, equipped with removable socket connectors having insulated handles.

No. 3. Pin and socket type connectors for all negative and safety ground cables; mounted on the outside of box to secure complete separation from positive circuits.

No. 4. Safety lever which must be lowered before main switch can be closed. This lever automatically locks all terminal connections in position and prevents any circuit being opened under load.

No. 5. Quick Break Switch operated by the opening or closing of hinged junction box lid.

No. 6. Detachable strain chains and clamps for each individual circuit and which prevents any strain on cable connector terminals.

No. 7. Bottom skids to facilitate moving of box to different locations.

Standard equipment includes 200, 100 and 35 ampere 250-volt enclosed fuses —solder type terminal connections eliminate necessity of all vulcanizing or splicing of cables, and 28" height of box permits use in low coal seams.

The Electric Railway Equipment Co.

2900-18 Cormany Ave. **Cincinnati, Ohio**

Prevent Fires In Wartime

Fire prevention week is observed every year during that week in which October 9, the anniversary of the Chicago Fire, occurs. But this year the war has given Fire Prevention Week unusual significance. The nation is preparing to defend itself from fire that may be caused by incendiary bombs. Equally vital is the need to prevent the slowdown of war production by fires that may result from sabotage or ordinary causes. And, at this time when we are facing material shortages, replacements in the home and elsewhere must be reduced to a minimum. The seriousness of the situation has been recognized by every organization concerned with fire safety, and, for the first time, the sponsors of Fire Prevention Week are joined, this year, by the U. S. Office of Civilian Defense which is charged with civil protection in wartime.

By virtue of the President's proclamation, the U. S. Office of Civilian Defense now calls upon the entire nation to heed the danger of fire, a danger which threatens our lives, menaces the security of our homes, and waits, ready in an instant, to sabotage our war industries. The ten most common fire causes in the last ten years are shown in the following table:

	Number of Fires	Loss
1. Matches—smoking	1,238,275	$174,979,768
2. Misuse of electricity	416,866	94,848,885
3. Exposure (fire originating off premises)	322,698	156,560,237
4. Sparks on roofs	300,994	70,208,310
5. Overheated or defective chimneys, flues, etc.	291,181	119,985,311
6. Lightning	259,591	50,516,178
7. Stoves, furnaces, boilers, and their pipes	253,382	100,344,879
8. Open lights	245,512	24,878,160
9. Petroleum and its products	221,725	77,897,461
10. Hot ashes and coals—open fires	189,111	26,624,942

DUST—

FIFTH COLUMN OF THE COAL INDUSTRY

CAN BE CONTROLLED WITH

Coaladd

The Scientific Dustless Treatment.

Don't confuse "Coaladd" with ordinary chemical treatment! It is different! *It wraps coal in a film!* It is harmless to metals and rubber belting. It answers every requirement of the producer, retailer and user. It is economical and highly effective.

THE JOHNSON-MARCH CORP.

52 VANDERBILT AVE. NEW YORK, N. Y.

ASK FOR DETAILS AND COST

Montana Mining Association Cancels Meeting

Owing to present war conditions, the Mining Association of Montana has cancelled its proposed annual convention which was to have been held at Livingston, Mont., on September 4 and 5, according to Anthony J. Strojan, Jr., Helena, president of the association. This action was taken after conferences with officers and members of the mining association and the committee of the Livingston Chamber of Commerce that was making arrangements for the gathering.

Due to transportation difficulties and the urge to produce strategic war materials, especially during the summer months, members preferred that the convention be called off.

H. C. Frick Coke Company Has Safety Record

Production of more than 2,700,000 tons of coal in three and one-half years without a single fatal accident, is the record employes of the H. C. Frick Coke Company mine at Ronco, Fayette County, Pennsylvania, have established. This was announced by Harry M. Moses, president of the U. S. Steel subsidiary.

Congratulations on the record were received by the company from Dr. R. R. Sayres, director of the United States Bureau of Mines, which recently completed an inspection of conditions in the mine.

Handy & Harman Wins War Production Award

G. H. Niemeyer, president of Handy & Harman, announced recently that the new joint Army-Navy Production Award for high achievement in the production of war equipment has been awarded to his company.

The award, recently established to supplant Navy "E," Army "A" and Army-Navy Star Awards, came from James V. Forrestal, Under-Secretary of the Navy. The award applies to all of the Handy & Harman organization and plants in recognition of their outstanding service in producing silver and silver alloys for use in war equipment. The formal presentation of the award was made August 15 in Bridgeport, Conn., where the company's principal plant is located.

Old Mine in Colorado Reopened

The Wilfley mine at Kokomo is again in operation after 36 years of idleness. In 1906 and 1907 this mine was a substantial producer. New mine development is virtually completed and a modern 75-ton flotation mill is to be erected to produce zinc, lead concentrates. The company recently secured a loan from the RFC. Charles G. Blaha is general manager.

SIMPLICITY
GYRATING SCREENS

Use the correct basic principle of Positive Eccentric Action, produced by a solid shaft with the counter-balance machined directly thereon, placing the balance directly under the load.

Other Simplicity features are the special rubber corner supports, screen cloth in tension four ways over a doubly crowned screen deck, and sturdy all steel construction with each machine finished in every detail.

Simplicity Gyrating Screens are available in sizes from a 2′ x 3′ up to a 5′ x 12′ in single shaft assemblies; built in one, two, three, and four decks; as standard inclined types and also as low head types, where desired.

Descriptive Bulletin Available

SIMPLICITY ENGINEERING CO.
DURAND, MICHIGAN

Now **UNION-CLIPPED**

Tuffy
Mining Machine Ropes

For QUICK Installation
without injury to rope!

No special tools are necessary —metal sheath protects rope end—simply push or pull rope into desired position. Tuffies, made of Union-Formed (pre-formed) Wire Rope, contribute to safety for workers—they last longer for less frequent replacements.

FREE SAMPLE
—of Union-Clipped Tuffy Mining Machine Rope. Write, wire or phone.

UNION WIRE ROPE CORPORATION
2144 Manchester Ave. Kansas City, Mo.
Tulsa Houston Chicago Salt Lake City
New Orleans Monahans Portland Ashland, Ky.

UNION
Wire Ropes
The "ULTIMATE LOW COST WIRE ROPE"

WHERE MECHANIZED WAR PRODUCTION
is mining more coal—

...ELL FIND
Sectionalizing Circuit Breakers doing their part

Sectionalizing Circuit Breakers help raise production, reduce fire hazards, lower maintenance charges and decrease total energy consumption and power demand.

Write for a copy of "D-C Circuit Breakers, Switchgear and Protective Relays for Mining Applications". Catalog 2502.

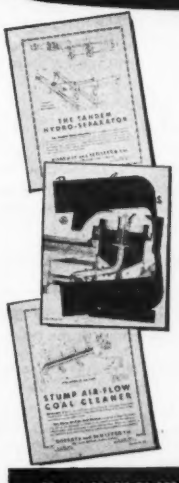
← *Type KSC Automatic Reclosing Circuit Breaker*

Representatives in Principal Mining Areas

I-T-E CIRCUIT BREAKER CO.
PHILADELPHIA, PA.

R AND S COMPANY

Equipment
FOR YOUR PARTICULAR JOB..



THERE is no other coal cleaning job exactly like yours.

R and S understands this and is prepared to recommend equipment that specifically meets your problem.

The following bulletins that outline some R and S equipment are available.

Write for them today

HYDRO-SEPARATOR
No. 156—FOR COARSE COAL
HYDROTATOR
No. 157—FOR FINE COAL
STUMP CLEANER
No. 158—FOR DRY CLEANING

There is no obligation

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307 North Michigan Avenue, Chicago
P. O. Box 865 PITTSBURGH, PA. | 201 ... Street, N. W. WASHINGTON, D. C. | P. O. Box 570 HUNTINGTON, W. VA.

Golden Anniversary Meeting of Illinois Mining Institute

The Golden Anniversary Meeting of the Illinois Mining Institute will be held on Friday, October 23, at the Hotel Abraham Lincoln at Springfield, Ill. An outstanding program, fitting the occasion of fifty years of service to the mining industry is being planned. Officers of the Institute are: J. A. Jefferis, president, St. Louis, Mo.; Carl T. Hayden, vice president, Chicago, Ill., and B. E. Schonthal, secretary-treasurer, Chicago, Ill.

Road Construction Aids Tungsten Producer

Building of a road to the Pole Canyon tungsten deposits near Mill City, Nevada, has been completed, and arrangements have been made for trucking tungsten ore to the Toulon plant operated by Rare Metals, Inc. The Pole Canyon comprises 16 claims and was recently leased and optioned from Harry Brechtel, Frank O'Leary and H. G. Murphy by Callahan Lead & Zinc Co. of New York.

WANTED—The Right People in the Right Places

The Government is seeking well qualified persons with experience in metals. The positions pay from $2,600 to $6,500 a year, and appointees should have a college education with a major in economics, or responsible experience or research work in the manufacture or distribution of metals.

They will conduct investigations, analyze price and cost data, negotiate with particular groups to set up reasonable price schedules and rationing controls, and evaluate the results achieved.

It is vital that the right people be in the right places—to the Government and to the United Nations in order to win the war. Applications should be made to the United States Civil Service Commission, Washington, D. C.; J. S. Hathcock, examiner in charge, Economics and Statistics Unit.

Another Great Lakes Ore Route Being Developed

An additional route for bringing iron ore down from the upper Great Lakes region is being provided for in a new program announced during the middle of August by WPB. Completion of the new route, expected by the end of this year is designed to lighten the load on the locks of Sault Ste. Marie, Mich., according to WPB officials. The improvements required are estimated to cost about 25 million dollars and will require a maximum of 5,000 tons of steel.

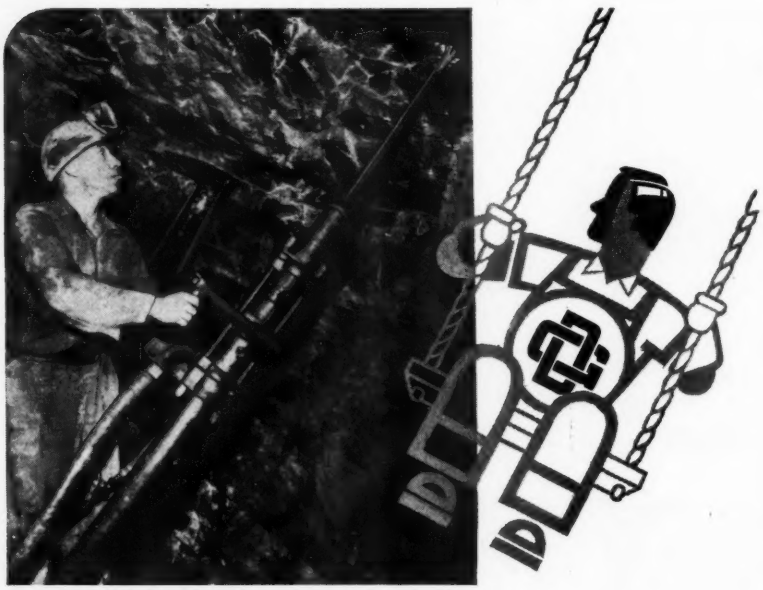
The new program involves immediate construction of ore yards and docks at Escanaba, Mich., and the possible dredging of additional harbor channels, and the improving of railroads between Escanaba and Ironwood, Mich., and Superior, Wis.

It is estimated that, if necessary, 100,000,000 tons of ore could be handled annually—60,000,000 tons via Escanaba from Michigan iron ranges and Duluth, and 40,000,000 tons from the Duluth area to Ohio and Pennsylvania furnaces by rail.

Census Of Second Hand Machinery Under Way

OPA has launched a survey to determine the whereabouts of every piece of second-hand machinery in the United States held for sale. The primary purpose is to provide the OPA with basic information required in connection with the administration of maximum prices for most machines and parts and machinery services.

In addition the inventory is intended to provide OPA and WPB with a complete census of idle machinery which owners and brokers desire to sell, together with prices being asked. WPB would thus have a stock list of second hand machines available for sale. The survey will also locate obsolete machinery which may be converted into scrap.



What's Behind the Swing to Gardner-Denver R-104 Stopers

Better balance—far better sludge protection. These are two important *extras* which are provided in the Gardner-Denver R-104 Stoper. They explain the big swing to R-104's—the reason these stopers are replacing other makes in so many mines across the country. Because of their better performance and exceptionally low maintenance requirements, they make firm and lasting friends among mine operators and drill runners alike. Below are typical user reports. For complete information, write Gardner-Denver Company, Quincy, Illinois.

"The R-104 has made a splendid showing—has outperformed the..... machine." "Where the ground is the toughest in this territory, both miners and manager are highly pleased with the R-104."

"... R-104's are doing a splendid job, and the mine captain says miners do not want to run any other stoper."

A mine superintendent says: "The R-104's are doing real well here, both on performance and cost. It's the lowest upkeep machine at the mine."

"R-104 Stopers so seldom come to the shop for repairs, that the repair man says he does not want anything else."

The Gardner-Denver R-91SC Stoper—a worthy companion to the R-104—gives the same balanced performance in a lighter stoper.

GARDNER-DENVER PRODUCTS MEN SPEED VICTORY

GARDNER-DENVER *Since 1859*

National Safety Congress to Meet In Chicago

The 31st National Safety Congress and Exposition will be held October 27, 28 and 29. It will be housed in three big Chicago hotels—the Sherman, the La Salle and the Morrison, with convention headquarters at the Sherman Hotel. This is a change from the original plans but it will in no way affect the size, scope and importance of the Congress. There will be 200 sessions, with 500 program participants.

Wheels

(*Continued from page 51*)

haps with a living cost authority empowered to have the final decisions on wage increases and price ceilings. Such an authority might consist of OPA Leon Henderson, WPB Donald M. Nelson, WLB Wm. H. Davis, and War Manpower Commission Director Paul McNutt.

Draft Deferments

Consciousness of the importance of mine production brought an appeal from War Manpower Director McNutt late in August to miners to stay on their jobs. McNutt stated that the retardation of production of copper, lead, zinc, chromium, manganese, molybdenum, mercury, tungsten, and vanadium calls for the elimination of high labor turn-over, long week ends, and restrictive peace-time hiring practices. He further announced as a program that (1) the War Labor Board has arranged for early action on the large number of non-ferrous mine cases now before it and for a retroactive payment of any wage increases which may result; (2) Selective Service Office in Washington is advising local boards to consider occupational deferment for workers; (3) mine operators are being urged to utilize training facilities of the War Manpower Commission and the recruitment facilities of the U. S. Employment Service to increase their labor forces; (4) local tire rationing boards have been asked to give special consideration to transportation needs of mine workers; and (5) certain steps, although not enough, are being taken to prevent contractors from "pirating" metal miners for jobs in war plants. The Army and Navy have also been ordered to stop all voluntary recruiting in order to accomplish the orderly inducting into the armed services of men from the ranks of labor, and the prevention of large numbers of men leaving key production jobs to join the armed services.

The War Manpower Commission is planning to utilize a revised and considerably enlarged list of critical occupations in coal mines in connection with the draft deferment activity of the Selective Service System and its local boards. Also effective at the end of August was an Occupational Bulletin to local draft boards covering a comprehensive list of critical occupations in non-ferrous smelting and refining industries. This list, certified by the U. S. Bureau of Mines and prepared by representatives of the smelting and refining industry through the American Mining Congress, has been "in process" for several weeks.

Mine Lessees Under Wage Hour Act

Confronted with the repeal of the War Production Board for increased output of metals, the Wage-Hour Division of the Department of Labor in early August made announcement of the factors by which they will be guided in determining whether mining lessees are to be considered as employes or as bona fide independent operators. Stating that the Division does not take exception to the reasonable exercise of control over a "block" leaser or other lessee, the following provisions were, however, held to be inconsistent with the existence of an individual lease: "(1) A provision requiring the lessee to work on the premises for a certain stipulated number of shifts each month or with a certain minimum number of employes; (2) the requirement that the lessee must submit the names of his 'employes' to the lessor for approval; (3) a stipulation requiring the lessee, under penalty of forfeiture, to file a monthly report with the lessor indicating the number of shifts worked, the nature of work done, and the amount of work performed." It was also stated that a lease for less than six months will not be considered bona fide and that the Division will question the independence of a lessee under a lease which gives the lessor the discretionary right to cancel prior to the end of the stipulated period.

Get That Steel

Even with congressional sources and war contractors directing severe and probably undeserved criticism at the War Production Board with reference to steel distribution, the Mining Branch has been able to secure a considerable quantity of steel for third quarter consumption, so that mineral producers and the manufacturers of mining machinery and equipment are being reasonably well cared for.

On August 8, Amendment No. 3 to Preference Rating Order P-56 authorized mineral producers to apply A-1-a ratings directly to a certain proportion of their repair and maintenance requirements, without having to clear each such case through the Mining Branch. Another excellent provision of the amendment specifies that materials required for repair in emergency breakdowns may be given "such ratings as may be required to obtain deliveries." This means that the Mining Branch is going to get such materials for the mines practically on an equal basis with the Army and the Navy.

Dr. Wilbur A. Nelson has been called from the Mining Branch, where Dr. Marcellus Stow will act in his stead, to the capacity of Special Assistant to the Deputy Director General for Industry Operations, A. I. Henderson. Dealing with all phases of metal production, Dr. Henderson will function for the WPB in matters of prices and their effect, taxation and its effect, miners' absenteeism and morale, development of access roads to mines, and any other overall problem of mines' operation which are holding back production. A particular interest expressed by Dr. Nelson is that of the need for stimulation of development work in the nation's mines so that future production may not break down when present development becomes exhausted.

PETER F. LOFTUS
Consulting Engineers
ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY
Oliver Building Pittsburgh, Pa.

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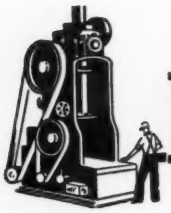


MANUFACTURERS' Forum

Portable Floodlight For Combustible Areas

A portable battery-operated floodlight has been announced by the Illuminating Laboratory of the General Electric Company, Schenectady, N. Y., especially for combustible areas which cannot have installed lighting. This unit is intended for use in such places

as powder igloo interiors, powder magazines, freight car and warehouse interiors containing combustibles, and during blackouts and other emergencies.

The floodlight consists of a small steel box (19 x 9⅞ in. x 20¾ in.), with a special dust- and vapor-proof lamp housing mounted on a bracket to allow pointing in any desired direction. A high-efficiency glass reflector, combined with pre-focus positioning of the unit's 50-candlepower concentrated-filament type bulb and a diffusive lens, gives a powerful medium-angle floodlighting distribution.

A 5-cell storage battery with non-spill valves is housed in the box. Quick exchange of discharged for charged batteries is made possible through a polarized connector permanently wired to the battery terminals. Normal burning time for the unit is approximately 10 hours.

Finger Protection

In connection with the announcement of three chrome leather finger cots, American Optical Company of Southbridge, Mass., points out that sturdy, dependable finger protectors are more and more replacing the use of makeshift strips of gummed paper, bits of cloth, and adhesive tape.

Finger cots, the concern states, are particularly valuable where operators must handle small, rough objects or hot articles which are not too large in size.

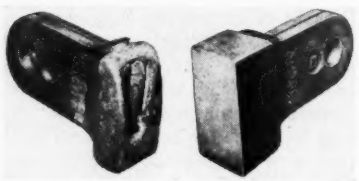
The AO 1000 chrome leather finger cot (short type) the company recommends for operations in which only one or two fingers need to be protected, or where there is only an intermittent finger hazard.

The second type—the No. 1001 chrome leather finger cot (tie-on type)—is unusually large, and can be used as a dependable protection for a finger or thumb that is bandaged. The tie-on feature makes it applicable to a wide number of uses.

The No. 1688 chrome leather two-finger and thumb protector is recommended for operations where several movements require finger protection while succeeding movements require the accuracy and sense of touch of a bare hand.

Three-Part Pulverizer Hammer

The Clark Renewable Tip Pulverizer Hammer (patent applied for) is announced by the American Manganese Steel Division of The American Brake Shoe & Foundry Company, Chicago Heights, Ill. Its design features conservation of metal. The hammer consists of a weighted manganese steel



A new hammer and one worn in service. New closed type hammer complete weighs 110 lb., bars 57½ lb., head 52½ lb., worn bars 57 lb., head 16½ lb.

head connected to the rotor by two matching arms or bars of manganese steel. On the lower end of each bar are hooks which engage internal pockets in the head. The bars are bolted together under the eye so that they form a one-piece arm; yet they are said to be easily disengaged from the service worn head by unbolting.

It is claimed that this new design has six distinct advantages: great saving in weight of discarded parts; two-thirds of hammer head can actually be used up before renewing is necessary; time consumed in removing old and replacing new head is negligible; no operating stress is imposed on shank bolt used for assembling; head cannot work loose and come off arm as long as the latter is on the supporting rotor pin; and no metal is lost by too early discarding of heads as the maximum use is indicated when lower ends of arms are visible.

An Aid in Preventive Maintenance

The Boyer-Campbell Company, 6540 Antoine St., Detroit, Mich., has announced four new models in its line of Super Sight magnifying lenses for use in close observation of worn or new machine parts. The model shown has two magnifying lenses (top lens 5 in., lower lens 4 in.), lower lens adjustable to proper focus—lenses lighted separately, permits using one or both lenses as occasion demands. Head is balanced to bracket and can be instantly put in any position over a wide bench area. The operator is checking the condition of thread

Plastic Suitable To Replace Rubber

New formulations of ethyl cellulose plastic designed to replace rubber have been found suitable for many uses of the now scarce material, Hercules Powder Company, Wilmington, Del., has announced.

Soft formulations of this plastic can be used instead of rubber in gun covers, electrical tape or "friction tape," water tubing to replace brass, raincoats, hospital sheeting, garden hose, and other kinds of rubber hose, surgical tape, wire insulation, impregnated fabrics, coated fabrics, washers and footwear.

Ethyl cellulose in the form of a soft plastic for these applications is not only a new approach to the rubber problem but a comparatively new development in plastics, most of which heretofore have been hard plastics, the company said.

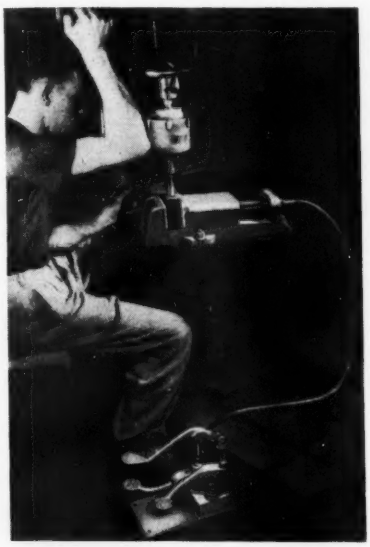
Ethyl cellulose when compounded with oil and chemical plasticizers in the range of 40 to 60 percent ethyl cellulose and 60 to 40 percent plasticizer, produces compositions having many of the qualities which have made rubber applicable to numerous products.

The new plastic formulations, the company said, while not suitable for tires or inner tubes as presently developed, would probably be suitable for rubber applications which before the war consumed 60,000 tons of rubber.

New Hydraulic Drilvise Closes and Opens Automatically

The Studebaker Machine Company, 9 S. Clinton Street, Chicago, Ill., recently announced its new Drilvise designed for holding work on the table of all types of drill presses, planers, shapers, milling machines, surface grinders, lathes, cut-off saws and other machines.

Entirely foot controlled and hydraulically operated, this new tool permits the use of both hands in the operation, set-up and removal of work from the machine on which it is mounted. Exceedingly powerful, exerting in excess of 10,000 lbs. per sq. in. pressure between the jaws, this unit is said to be ideally adapted for hundreds of machine shop uses. Though of sufficient weight (74 lbs.), yet not cumbersome, many jobs can be handled without bolting or clamping to the machine table.



Self-sufficient, requiring no outside power or air supply, the unit consists of a conventionally-shaped drill press vise (but without the usual screw or handle) and connected to it by a 6-ft. length of flexible rubber tubing is a hydraulic foot control base. Parts are readily portable and can be easily moved from machine to machine.

Specifications of this unit are: width of jaws, 6 in.; depth of throat, 3 in.; width of jaw opening, 5 in. The Drilvise measures 30 in. long by 8¼ in. wide by 5¼ in. high. Weight 74 lbs. Hydraulic foot control measures 11 in. high by 10½ in. wide by 14 in. long, and weighs 36 lbs. Total shipping weight, 120 lbs.

Automatic Car Spotter

The new automatic car spotter by the Brown-Fayro Company is designed for use where a single-belt conveyor serves a large number of working places, and where coal may be loaded into mine cars at rates as high as six tons per minute. Using Westinghouse electric controls, a barney, attached to the endless rope, operates in guides set between the rails. Under the control of the operator and the limit switch, this barney is pulled forward exactly one car-length, then is automatically stopped and pulled back one car-length. On the forward motion the barney engages a lug on the car and pulls the entire trip with it, stopping an empty car exactly under the conveyor discharge. Thus a constant supply of empty cars, placed at the loading point, permits the conveyor to pour out a continuous stream of coal without shutting down to change ropes.

The car spotter is rated 12,000 pounds rope pull and is geared for a slow hauling speed of 40 ft. per minute; a fast hauling speed of 60 ft. per minute, and a return speed of 80 ft. per minute. The barney can be returned two car-lengths instead of one at the discretion of the operator. Quick starting and stopping is accomplished by means of automatic acceleration and dynamic braking.

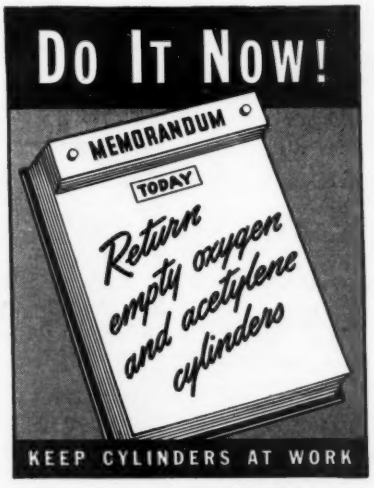
New Spectrum Chart Published

Of special interest to teachers of physics, chemistry, and electrical engineering, and to practicing engineers and scientists, is a new seven-color wall chart of the entire electromagnetic spectrum recently published by the Westinghouse Research Laboratories.

Approximately 30 by 40 in. in size, the chart is printed on heavy white cloth, and is bound at top and bottom in ⅜-in. black-enameled wooden rods. Two metal rings are attached to the top binding rod for convenient hanging.

Every part of the electromagnetic spectrum, of practical significance, is analyzed in detail. Emphasis is placed on uses of each kind of radiation. Spectral terms are carefully and simply defined in a special glossary.

Each chart is packed in a substantial closed cardboard tube, and is sent postpaid. The price is $2. Orders should be sent to Publications Section, 6-N-17, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.



Machine For Use in Rubber Salvage

Like other large corporations, The Timken Roller Bearing Company, Canton, Ohio, frequently accumulates sizable quantities of scrap electric cable. Until recently it has been general practice to burn the rubber and cloth insulation off these cables to salvage the copper.

Timken conservation men, seeking a method of salvaging cable rubber, experimented with a standard Buffalo bending roll machine. This consists of three smooth wheels, two of which are in tandem beneath a third wheel which is centered above them. Varying pressures are exerted upon the material to be bent by raising or lowering the upper wheel.

Timken engineers removed the one lower wheel and replaced it with a notched gripper wheel. A sharp center-flanged wheel replaced the upper wheel. No change was made in the third wheel. This conversion proved extremely effective in removing the outer layer of cable cloth insulation and the inner layer of fine rubber, which is so urgently needed at the present time. The gripper wheel feeds the cable between the flanged cutter wheel and the pressure wheel, slicing the cable open and peeling it simultaneously. The cloth cable cover drops away from the rubber leaving the rubber and copper cable in a salable condition without further attention. Cable rubber salvaging is accomplished at the rate of about 6 ft. per minute. Cables ranging in size from ⅝-in. to 2-in. are easily handled.

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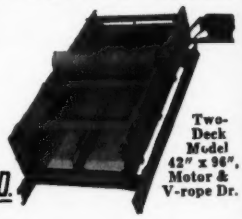

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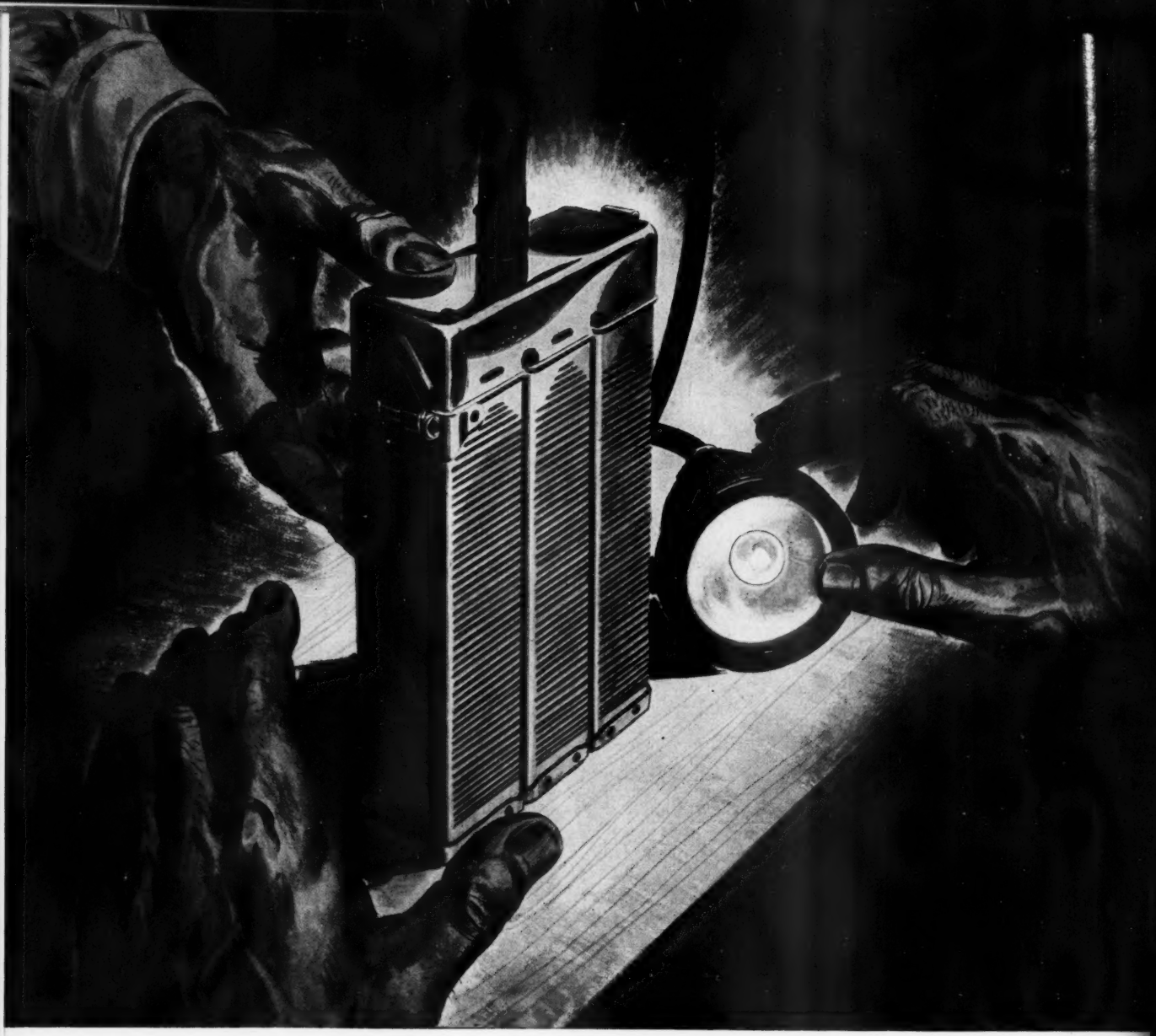

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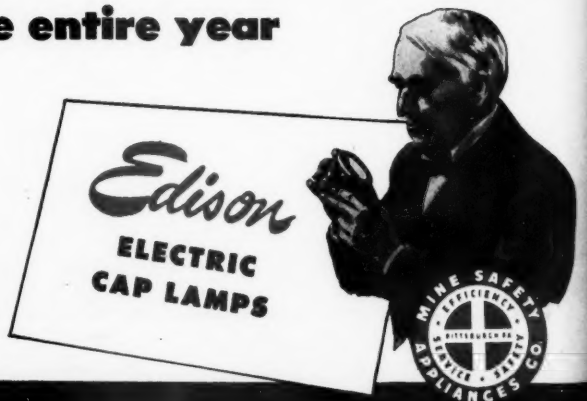

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